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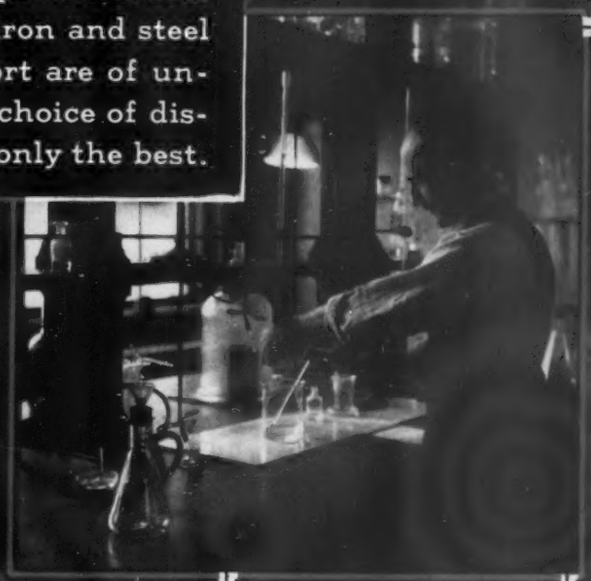

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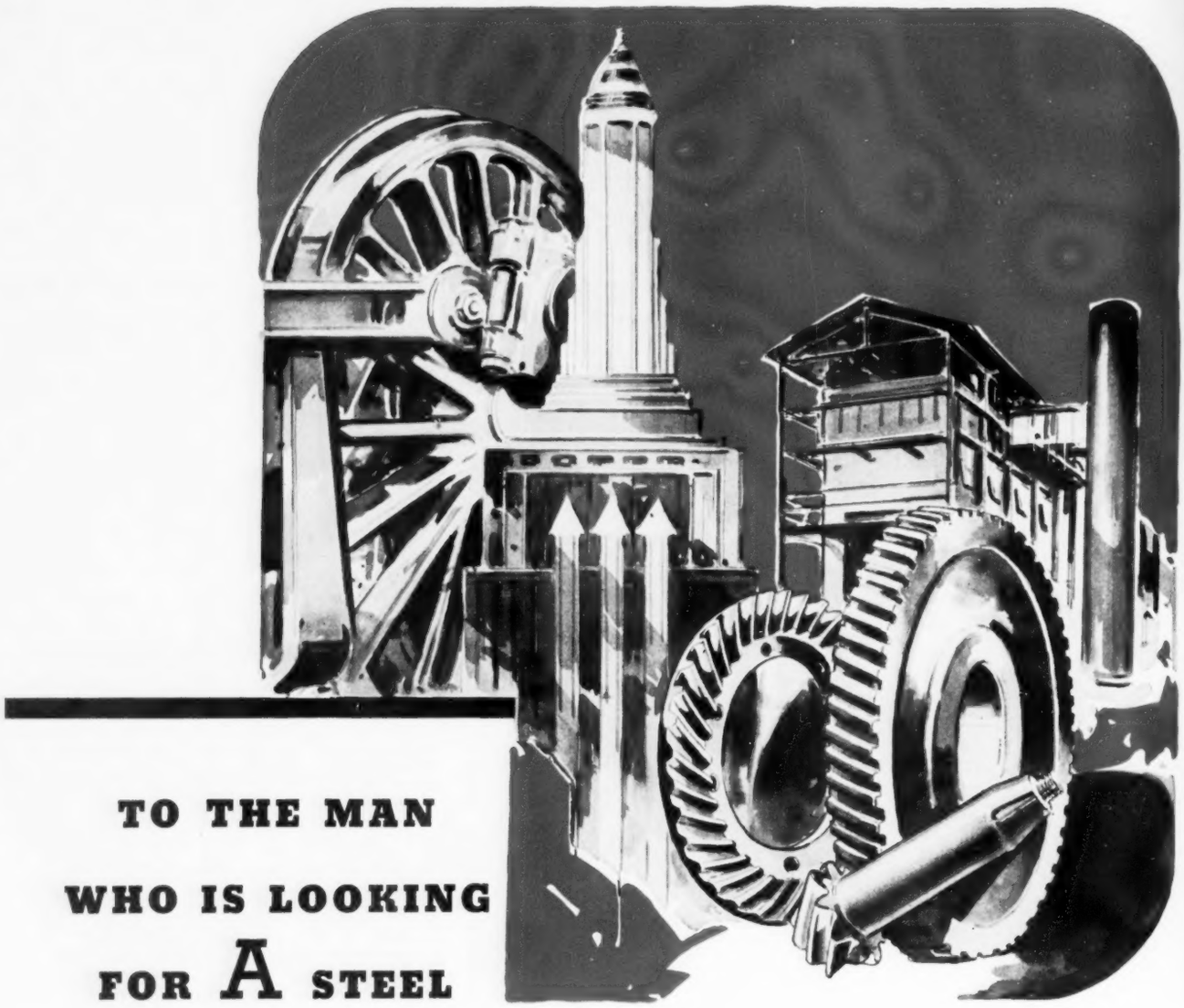

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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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Contents . . July 15, 1935

Volume 97 ◆ Number 3

AS THE EDITOR VIEWS THE NEWS 15

Moderate-Size Steelmakers in Best Earning Position 16
Economics Increases Production in Depression 17
A. I. S. C. Creating Bid Depositary 17
Taxes Take 66.4 Cents from Steel Dollar 18

Labor	18	User's, Makers' Activities	80
Production	22	Financial	90
NRA	26	Safety	90
Transportation	26	Meetings	90
Institute	28	Steel in the News	90

All-Metal Staterooms Thrust at Sea Fire-Hazard 19
Scrap, Tin Plate Push June Exports High 20
June Ingots Down; Half Holds Well 20
5080 Foundries in U. S.; 470 in Canada, Survey Shows .. 21
Mirrors of Motordom 23
Windows of Washington 25
Industrial Men in the Day's News 27
Obituaries 28

EDITORIAL—Steel Is Shifting Base 29

THE BUSINESS TREND 30

ENGINEERING DEVELOPMENTS:

Checking Gear Accuray	32	To Buy or Not To Buy?—VII	48
Aluminum Shovel Dipper	36	New Steel House Design	51
Merchandising New Product	38	Progress in Steelmaking	54
Use of Spectrograph	40	New Mill Nears Completion	55
Methods and Materials	41	Open-Hearth Design—VII	57
Welding Grave Vaults	42	New Equipment	63
Improved Leather Belting	44	Trade Publications	67
Robert E. Kinkead	46		

MARKET REPORTS AND PRICES 69-89

CONSTRUCTION AND ENTERPRISE 92

ADVERTISERS' INDEX 100

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As the Editor Views the News

LEGISLATORS chained to their posts in Washington to write a "soak-the-big" tax program will find food for thought in the record of steel company earnings. STEEL, segregating 20 leading companies in groups according to size, finds that the group of the smallest companies earned a higher return on capitalization (p. 16) than any of the groups of larger corporations. The giants do better than the pigmies in prosperity but fare worse in adversity. To schedule taxes which will cover this situation equitably is not a job that can be done well under Executive duress in the furnace heat of Washington in July.

• • •

Mortality of Foundries Low

A census of foundries, compiled in *Penton's Foundry List*, shows that in spite of the unrivaled severity of the depression the shrinkage in the number of casting plants from 1930 to 1935 has been slight. Today the number of foundries in the United States is 5080 (p. 21), a loss of 345 or 6.4 per cent from the 1930 total. Canada has 470 casting establishments—a decline of 4.85 per cent. Far more important than the change in numbers is the marked advance in the quality and diversity of castings during the period. This progress augurs well for the future of the industry.

• • •

A Step Toward Ship Safety!

Hope that civilization may profit from the lesson learned at great cost from the MORRO CASTLE disaster last September is kindled by announcement (p. 19) that a shipbuilder has completed an all-metal stateroom. The appointments correspond in every desirable particular with those of a wooden stateroom, but the fire hazard is eliminated. Bulkheads, ceilings, decks, structural details and furring are of steel. The trim is of aluminum. The important point is that this demonstration seems to indicate that all-metal construction affords a stateroom at reasonable cost, with pleasing appearance and within the weight allowance permitted in modern ship design. Should this experiment lead to the general adoption of metal staterooms, steel and its supplementary nonferrous metals soon will be preserving life on sea just as they have in land and air transportation through the replacement of inflammable materials.

• • •

Business Is Looking Up!

The most significant aspect of the current business situation is the gratifying rebound of activity (p. 30) from the interruptions of the July 4 holiday. While buying of steel by the railroad and construction industries is negligible, the demand from automobile builders and partsmakers and from miscellaneous sources has been sufficient (p. 69) to more than restore operations to the preholiday level. This recovery is all the more remarkable when compared with the feeble rebound in the corresponding week of 1934. The snapback in automobile assemblies is encouraging to Detroit observers (p. 23) who are predicting that in 1936 automobile production will be 15 to 20 per cent ahead of 1935 output. Business is looking up!

• • •

Why Is Survey Like Ticket?

Illustrative of the current urge for lightweight construction is the design of dippers for large power shovels used in coal stripping operations. A shovel manufacturer has completed several dippers (p. 36) in which the use of aluminum alloy plates and other parts in combination with steel members has made it possible to increase the capacities of the dippers 33 1/3 per cent without adding to the weight. . . . Copper-bearing sheets and small steel angles are the principal structural materials (p. 51) in a house of novel construction now on exhibition on the campus of Carnegie Tech at Pittsburgh. . . . An authority on merchandising of steel says (p. 38): "A good market survey is like a railroad ticket. It will take you places only when you use it."

E. L. Shaner

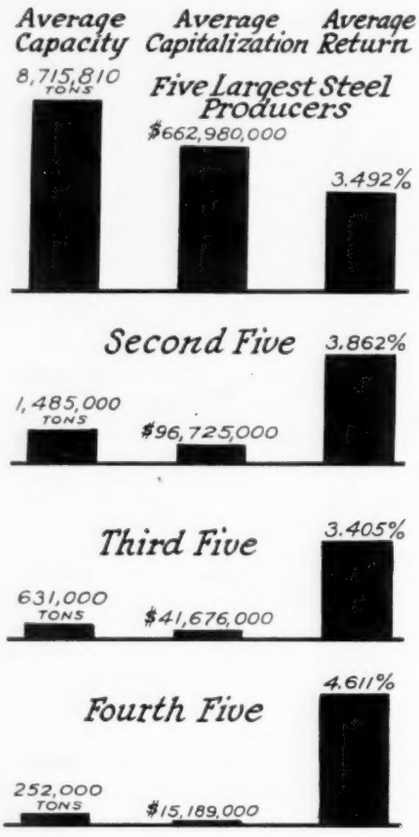
Moderate-Size Steelmakers In Best Earning Position

IN THE "spread the wealth" and the "soak the rich" campaign being promoted by the President and his supporting cast of new dealers, the principal thrust at iron and steel is a proposal to increase corporation taxes from a flat 13¾ per cent to a maximum of 17½ per cent, and possibly also a levy on corporation surpluses. The assumption in Washington is that bigness in corporations is anti-social, and the heavier the burden of taxation on large aggregations the sooner they will be dispersed.

Earnings Tell Story

To ascertain the experience of iron and steel from the standpoint of size and return upon capitalization, STEEL has turned to its annual analysis of earnings. For the decade 1925 to 1934 inclusive, which includes the sweet of 1929 and the bitter since, it has segregated producers in groups of five, graduating them downward in point of ingot capacity. Averaging the experience of these groups over this decade, a study shows:

The most profitable companies, from the standpoint of return upon investment, have been those in the fourth smallest group, whose average ingot capacity is 252,000 tons and whose capital averages $15,189,000. Over ten years this group has averaged 4.611 per cent upon its investment, it was in the red in only one depression year—1932, it has come back the fastest. While the representation in this bracket has varied, Gulf States Steel Co. has been in it seven of the ten years, Midvale Co. eight, and Granite City Steel Co., Continental Steel Corp., Ludlum Steel Co. and Interstate Iron & Steel Co. (now merged) four times.



Second most profitable classification is the second largest, in which the principal factors have been the Wheeling Steel Corp., American Rolling Mill Co., Inland Steel Co., and Crucible Steel Co. of America. The average size of this group is 1,485,000 tons and the average capital $96,725,000. Its average return in the decade ended with 1934 was 3.862 per cent, and it also was in the red, as a group, only in 1932.

Leaders in Third Place

In third place are the first five ranking integrated producers, including United States Steel Corp., Bethlehem Steel Co., Jones & Laughlin Steel Corp. and Youngstown Sheet & Tube Co. for the entire period. Their average return has been 3.492 per cent, they have been in the red beginning with 1931.

Bringing up the rear is the third bracket which has principally included the Pittsburgh Steel Co., Otis Steel Co., Lukens Steel Co., the former Donner Steel Co., and Sharon Steel Hoop Co.. It has netted an average return of 3.405 per cent. As a group it was the best earner in

Financial Experience of Iron and Steel Producers, Classified by Size, in Past Decade

	Per Cent Return on Capitalization										
	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Ten-year average
First Five Producers—Ranging from 27,000,000 to 1,600,000 tons ingot capacity; average 8,751,810 tons. Capital from $2,178,000,000 to $109,000,000; ave. $662,980,000	5.24	8.33	6.30	6.63	10.57	3.92	*0.43	*4.08	*1.40	*0.16	3.492
Second Five Producers — 2,232,000 tons to 837,000 tons ingot capacity; average 1,485,000 tons. Capital from $147,481,000 to $75,277,000; average $96,725,000.....	4.44	6.57	5.00	7.27	9.73	5.23	0.49	*1.61	1.75	3.47	3.862
Third Five Producers — 1,003,000 tons to 338,000 tons; average 631,000 tons. Capital from $118,854,000 to $10,413,000; average $41,676,000	4.17	6.08	5.38	7.89	11.62	3.96	*2.33	*3.34	*1.44	2.06	3.405
Fourth Five Producers — 450,000 tons to 22,000 tons; average 252,000 tons. Capital from $30,211,000 to $4,826,000; average $15,189,000	8.60	5.48	5.10	7.39	7.75	8.49	0.75	*2.33	1.48	3.40	4.611

*Loss.

Overlapping of ingot capacity and capitalization in various groups is thus explained: Each year groups are arbitrarily limited to five. As companies fluctuate from one group to another, for one year the highest in one group may be slightly higher than the lowest of the next highest bracket. In each year the analysis is strictly in order of ingot capacity.

1929, it went almost as low as the first bracket in 1932, and it was in the red for three years.

Thus, entirely from the standpoint of return on capitalization and not related to a stock market return, magnitude is not the path to riches in iron and steel, but rather carries its own handicap.

The average return the past ten years of 4.611 per cent in the fourth or smallest group studied is 32 per cent larger than the average of 3.492 per cent returned by the five ranking interests of the industry.

From a purely mathematical standpoint, this lowest bracket in point of size neither scaled the heights nor plumbed the depths of large competitors.

On the other hand, there have been more readjustments in financial structure in this blue ribbon group, but they have not been alarming or conclusive; in fact, the entire steel industry has been singularly free from serious financial calamities.

A.I.S.C. Creating Bid Depositary

AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC., 200 Madison avenue, New York, last week issued a booklet giving an outline of the proper elements of cost for bidding, as prepared by its committee on cost accounting.

It announced the establishment of a department of statistics to gather and disseminate information as to the costs of the products and services of the industry, the volume of production and sales, and the actual prices which the products and services of the industry have brought in past transactions; announced the establishment of a single bid depositary; and re-stated the trade practice rules of fabricators of structural steel approved by the federal trade commission May 29, 1931.

In regard to costs, the Institute gives details on the delivered cost of fabricated structural steel, total cost exclusive of erection, cost of erection, total cost of erection, cost of materials, and a general description of costs included in shop burden.

The Institute through its bid depositary will receive a sealed copy of each bid on jobs of 50 tons or more, and after receiving notice from the successful bidder that the job has been awarded the director of statistics of the institute will open these sealed bids, tabulate them, and mail them to each bidder.

This action consummates the position taken by directors of the Institute June 26. So far as known, it represents the first detailed program undertaken by a major industry since the demise of NRA.

Economies, Not Mechanization, Increase Productivity During Depressions

THE basic reason for the increase in productivity during a period of business depression is not mechanization of industry, but rather the drastic elimination of all waste, and rigid economies all along the line of production and distribution, practiced by industry as a whole as a means of maintaining markets in a period of declining demand, according to another in the series of studies made by the National Industrial Conference board for the National Machine Tool Builders' association.

POPULATION, MANUFACTURING PRODUCTION, AND PRODUCTION PER CAPITA, 1899-1929

Index Numbers, 1899=100

	Total population	Production of mfg.	Per capita production of mfg.
1899.....	100	100	100
1909.....	121	159	131
1919.....	140	214	152
1929.....	162	316	194

The Conference board is making a survey to determine the extent of mechanization in industry, machine production and related facts.

"During the current business depression there has been a large increase in the output of industry per worker employed," the Conference board reports. "It is a serious mistake, however, to assume that the efficiency of labor and capital would remain at this high level in the event of a genuine business revival which would lead to re-employment of less efficient workers and which would relieve management from the necessity of rigid economizing.

"Along with the vast mechanization of industry the number of workers during the period 1899 to 1929 increased 110 per cent, while hours of work per week were reduced only 15 per cent. Despite the vast increase in the output per man-hour and a relatively small reduction in hours, the percentage of unemployment was smaller during the post-war period from 1923 to 1929 than in 1899 or 1904. While it is true that the decrease in hours may have been to some extent responsible for maintaining the volume of employment, this decrease is small compared to the increase in the productivity of industry.

"During this period, increased productivity of industry per man employed was reflected primarily in a great improvement in the standard of living of the entire population.

"Among a multitude of controversial economic theories which attempt to explain the causes for business fluctuations, a prominent place is occupied by

Shades of Robert Fulton!

Strikingly streamlined and glistering in its coat of aluminum paint, the ferry KALAKALA *of the Puget Sound Navigation Co., now being put in service between Seattle and Bremerton, gives the illusion of a mammoth airplane skimming the waves. Electric welding was used throughout. Gracefully-rounded I-beams replaced conventional angles. For reconstructing the ship into its present streamlined form 500 tons of plates and 300 tons of shapes were supplied by the Pacific Coast Steel Co., A. M. Castle & Co. and Barde Steel Co. Wide World photo*

the theory that technological progress is the cause. Other theories attribute cyclical fluctuations to such causes as: Spots in the sun; agriculture; lack or over-abundance of money; domestic trade; international trade; capital; interest; labor; human behaviorism; over-production; under-production; over-capitalization; under-consumption; concentration of wealth; concentration of income; and many other supposed causes. It would be as fallacious to evaluate these theories individually as to state dogmatically that any one or all are wrong or right.

Theories Are Disproved

"Theorists who accuse technological progress of being the root of all evil maintain that over-capitalization and displacement of labor by machinery has brought about a lack of equilibrium between consuming and producing powers. The accompanying tabulation indicates that up to 1929 this was not the case because in 1899 and 1904, for example, there was relatively more unemployment than, on the average, during the decade of the '20s. This is especially noteworthy in view of the fact that every man-hour of production in manufacturing produced twice as much as in 1929 as it did 30 years prior to that date and was accompanied by a decrease in weekly hours of only about 15 per cent during this period.

"The effect of this increase in productive power was an enormous increase in the standard of living from 1899 to 1929. Per capita production of manufactured goods developed greatly during these years, and American manufacturing industries were able to provide every man, woman and child in this country with twice as many goods in 1929 as they did at the beginning of the twentieth century.

"At the turn of the century the possession of an automobile was a distinctive mark of affluence, while today millions of people in moderate circumstances enjoy this luxury. Radio sets were undreamed of, and electric refrigerators, for instance, were unknown except possibly in scientific laboratories and their use, such as exists today, was a development which existed than as little more than a fantastic dream."

Taxes Take 66.4c From Steel Dollar

TAXES paid by the iron and steel industry for the six-year period from 1929 through 1934 amounted to 66.4 cents out of every dollar of net income, according to data supplied to the American Iron and Steel institute by 26 leading steel companies representing over 93 per cent of the country's steel capacity.

Payments of federal, state and local taxes during this period totaled $390,000,000. Net earnings of these companies for the same period, after all charges, except taxes and before payment of dividends, aggregated $587,900,000.

The Institute, however, reports in no year since 1930 have these companies earned an aggregate net, after all charges were provided for, sufficient to pay all taxes.

Proportion of all taxes paid to gross sales of these companies ranges from a low of 4 per cent in 1929, when gross sales were estimated at $2,387,000,000, to a high of 7.6 per cent in 1932, when gross sales shrank 71 per cent to $689,000,000. Over a six-year period gross sales aggregated $8,180,000,000, of which 4.8 per cent was paid in taxes.

An Apostle of Safety in Action

Arthur H. Young, a vice president of the United States Steel Corp., speaking at Buffington, Ind., June 27 when the Buffington plant of the Universal Atlas Cement Co., a Steel corporation subsidiary, unveiled the safety trophy of the Portland Cement association awarded for its perfect safety record in 1934

Labor

OVER 90 per cent of steel employes are actively participating in representation plans, according to an American Iron and Steel institute survey. A similar survey a year ago indicated representation plans were supported by 85 per cent.

The recent survey is based upon June elections by employes of 20 steel companies, operating 67 units. Of 213,806 employes available and eligible to vote, ballots were cast by 192,699, or 90.13 per cent.

IMPORTS COST 3900 JOBS

With steel and semifinished steel importations for the first five months amounting to 73,836 tons, or 65 per cent above the total for the corresponding period last year, the American Iron and Steel institute estimates over 3900 American workmen were deprived of full time jobs during the first five months. Of the number deprived, 2640 were steelworkers, 570 were miners, 590 were transportation men, and 110 engaged in manufacture of coke.

SCRAP STRIKE IS OVER

Strike of employes at iron and steel scrap yards in New York was ended July 10 when the strikers returned without an agreement. The waste material handlers union demanded a closed shop, a 40-hour week and a 50-cent hourly minimum; yards offered a 45-hour week, no work on Saturday, a 40-cent minimum. New York scrap dealers were to meet July 15 to draft a voluntary agreement covering minimum wages and maximum hours for the New York district to be signed only by employers.

VESTA COAL STRIKE ENDS

After a walkout lasting a week, about 2000 workers in the Vesta Coal Co.'s mines, subsidiary of Jones & Laughlin Steel Corp., Pittsburgh, returned to work early last week. The men were employed at Vestaburg, Richeyville, and Vesta No. 6.

TO HOLD CODE STANDARDS

Foundry Equipment Manufacturers association, 1213 West Third street, Cleveland, is recommending that the industry maintain code equivalents in working hours, wage rates, prohibition of child labor and other provisions.

All-Metal Staterooms Thrust At Fire Hazard at Sea

FOLLOWING the MORRO CASTLE *disaster Sept. 8, 1934, when 137 persons perished as fire swept this liner, off the New Jersey coast,* STEEL *in its issue of Sept. 17 directed attention, in generalities, to the possibility of using steel for interior finish, trim and equipment to lessen the fire hazard. The article that follows records an interesting experiment along this line.*

FIREPROOF ships best can be developed through the use of all-metal construction, is the conclusion of the Bethlehem Shipbuilding Corp. Ltd., Quincy, Mass., following an extensive study which was launched at a time when the MORRO CASTLE disaster had re-focused attention to the horrors and losses associated with fires at sea.

The company just has completed construction, at its Fore River plant at Quincy, of an all-metal stateroom which corresponds to a similar wooden statercom as built in one of the recently-constructed passenger ships. It is regarded as pointing the way in the design and construction of new ships in the future.

The unit, shown in the accompanying illustration, consists of a section of the hull of a typical passenger ship, including shell, deck, passage way and stateroom with hall, bath, wardrobes and other accessories. It is complete even to the architectural treatment which, with furnishings and decorations, has been under the personal supervision of Charles D. Wetmore, Warren & Wetmore, New York.

Combine Steel and Aluminum

In this all-metal unit, all bulkheads, ceilings and structural decks are of steel. All furring is of steel. The trim is aluminum. The finished deck is of composition.

The furniture, other than the chairs, is of steel and was made by the Simmons Co., New York. Chairs are of aluminum, furnished by Warren McArthur Corp., New York. The fireproofed fabrics for upholstering were furnished by J. H. Thorp & Co., New York. Rugs and bedding, other than linen, furnished by Irving & Cassson-A. H. Davenport Co. Boston, are fireproofed.

Hardware, substantial and solid, is made to design for this unit by H. S. Getty & Co., Philadelphia, and by C. Carlson Co., Boston.

The bathroom fixtures are simple and of the finest manufacture and were furnished by the Standard Sanitary Supply Co. Specially designed electric fixtures by Sterling Bronze Co., New York, have been incorporated in the scheme.

The finished decks are of gray composition field with border and inlays for squares of field in French blue.

Bathroom accessories, all steel, were furnished by Conant Bros. Co. In fact the most simple and most substantial equipment has been used throughout to solve this problem in a manner entirely practicable.

The rooms are painted a warm gray with a black and bright aluminum base. Furniture is enameled in peach color with black and chrome trimmings and figured black bakelite tops. All chairs are of aluminum painted black and upholstered with apricot brocade, fireproofed. The rugs are in two tones of blue, the bedspreads are of blue and silver, and all linen used in the bathroom is of blue and white to match the color scheme of this room.

Silverware and other accessories for the dressing table and desk were loaned by Hodgson, Kennard & Co., Boston.

Mr. Wetmore, collaborating with Bethlehem in working out various problems of this unit, decided to eliminate from the bulkheads all battens with the exception of the corner strips, and as a decorative feature to make use of vertical V lines (shown in the accompanying illustration) to relieve the monotony of an otherwise plain surface and to give the room a feeling of height. The bulkheads are so constructed that any section may be taken down to gain access to any portion of the unit.

Panels or bulkheads constructed as designed may be produced on a basis of quantity production in the shipyard, and require no fitting on the ship either for camber or sheer, and will lend themselves to any number of decorative treatments.

The ceiling is paneled and divided into symmetrical patterns by the use of small aluminum battens. These panels may be removed to gain access to the space above.

Hangings for ports are not included in the scheme. The ports, however, are framed by a cleverly conceived border designed as a part of both the architectural and decorative treatment for the room.

The cornice and base is very simple, the members being of extruded aluminum.

Simple Lines Give Dignity

The appearance is pleasing and while no attempt has been made to copy conventional design but rather to develop along the lines of a practical system of erection suitable to the medium employed, the result demonstrates that beauty and good appearance can be obtained by proper care wiithout the use of fussy and useless ornamentation. The room has a distinctly modern feeling while retaining something of the solidity and strength exemplified by the best of the American type of interior.

The detail design of the structure is subject to wide variation to suit

This typical all-metal full-size ship stateroom was designed by the Bethlehem Shipbuilding Corp. Ltd. and erected at its Fore River plant at Quincy, Mass.

particular cases, which is of great importance in ship applications. Basically the panels consist of two sheets of steel rigidly held in relation to each other by a special type of spacer which acts as a column or pillar. The spacing of these may be varied to suit conditions and a special joint has been developed to prevent the passage of flame around panel edges.

The resistance of this type of panel to the passage of heat and sound is very high and in special cases sound-deadening may be applied on either the outside or inside surface of the sheets. If applied on the outside it can be combined with the decorative scheme of the room which will be particularly valuable in public spaces. With modern materials the decorative possibilities appear to be unlimited although simplicity in this respect is to be recommended.

Doors and door frames are of special design, all connecting door frames be-

(*Please turn to Page* 91)

Scrap, Tin Plate Push Exports High

EXPORTS of iron and steel products from the United States in May at 286,599 gross tons rose 39.6 per cent over the 205,336 tons exported in April, as shown by compilations of the metals and minerals division of the department of commerce, Washington.

A major factor in this increase was a rise of 59 per cent in scrap exports over the figure attained in April. May scrap exports were 209,404 gross tons; in April, 131,731 tons. Other substantial increases were made in skelp, galvanized sheets, tin plate, tin plate scrap and waste-waste tin plate.

For five months of 1935 steel and iron exports have totaled 1,306,247 gross tons, an increase of 26.3 per cent over the 1,033,768 tons exported in the same period of 1934.

May exports of scrap went largely to Japan, which took 118,231 tons, the United Kingdom 30,645 tons, Italy 25,366 tons, Canada 14,832 tons and Rumania 6828 tons.

The Far East took 49.5 per cent of all exports in May, Europe 28.1 per cent, North and Central America and the West Indies 17.3 per cent. South America took only 4.3 per cent and Africa 0.8 per cent.

Complete import figures appeared in STEEL July 8, page 20.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	May, 1935	April, 1935	Jan. thru May, 1935
Pig iron	248	74	1,004
Ferromanganese and spiegeleisen	1	1	34
Iron and steel scrap	209,425	131,731	900,844
Tin plate scrap	6,583	3,641	20,172
Waste-waste tin plate	4,941	1,839	12,555
Ingots, blooms etc.	1,675	8,283	26,502
Bars, iron	124	90	561
Bars, steel	4,364	3,927	22,272
Bars, alloy steel	164	207	1,032
Wire rods	1,150	1,330	8,794
Boiler plate	179	56	496
Other plate, not fab.	2,709	3,031	14,957
Skelp, iron or steel	2,724	978	6,236
Iron sheets, galv.	111	95	624
Steel sheets, galv.	7,445	5,442	31,481
Steel sheets, black	9,363	8,471	43,659
Iron sheets, black	653	716	2,554
Strip steel, cold-rolled	1,406	1,286	7,507
Strip steel, hot rolled	2,102	2,392	10,652
Tin plate, taggers' tin	7,349	4,849	46,535
Terne plate	175	264	1,196
Tanks, except lined	413	258	2,550
Shapes, not fab.	2,699	2,723	12,395
Shapes, fabricated	1,084	1,892	6,924
Plates, fabricated	73	463	746
Metal lath	83	60	299
Frames, sashes and sheet piling	927	456	2,919
Rails, 50 pounds	1,533	1,317	11,101
Rails, under 50 pounds	584	219	1,462
Rail fastenings	208	655	1,901
Switches, frogs, crsgs.	104	81	539
Railroad spikes	183	265	1,136
Railroad bolts, nuts	49	24	210
Boiler tubes, seamless	1,307	1,048	4,134
Boiler tubes, welded	97	57	317
Casing and oil-line pipe, seamless	1,001	1,262	10,213
Casing and oil-line pipe, welded	21	139	3,413
Seamless black pipe, other than casing, etc.	143	342	1,524
Malleable iron screwed pipe fittings	287	301	1,345
Cast iron screwed pipe fittings	156	49	619
Cast iron press. pipe and fittings for	1,005	118	3,873
Cast iron soil pipe and fittings for	185	263	1,668
Welded blk. steel pipe	968	2,050	8,394
Welded black wrought iron pipe	146	256	1,184
Welded galv. steel pipe	1,190	977	8,754
Welded galv. wrought iron pipe	107	98	444
Riveted iron or steel pipe and fittings	70	25	219
Plain iron or steel wire	1,162	1,062	6,220
Galvanized wire	1,893	1,616	8,095
Barbed wire	1,992	2,904	12,166
Woven wire fencing	130	181	700
Woven wire screen cloth	83	41	395
Wire rope	296	423	1,794
Other wire and mfrs.	364	497	2,122
Wire nails	688	938	4,227
Horseshoe nails	33	51	270
Tacks	29	26	162
Other nails, staples	212	194	1,102
Bolts, machine screws	595	566	2,838
Iron castings	697	924	3,706
Steel castings	161	229	1,105
Car wheels and axles	380	1,058	10,912
Horseshoes	1	42	67
Iron and steel forgings, n. e. s.	369	483	2,416
Total gross tons	286,599	205,336	1,306,247

June Ingots Down; Half Holds Well

PRODUCTION of steel ingots in June was 8.5 per cent less than in May, with a daily average of 89,236 gross tons, compared with 97,624 gross tons in May. The per cent of capacity engaged in June was 40.31 compared with 44.10 in May. Average daily output in June, 1934, was 117,672 gross tons, at 53.44 per cent of capacity, according to figures compiled by the American Iron and Steel institute. Total calculated production in June was 2,230,893 gross tons, in May, 2,633,857 gross tons, in June, 1934, 3,059,483 gross tons.

For six months of 1935 average daily output was 103,385 gross tons, at 46.70 per cent of capacity, compared with daily output of 105,145 gross tons at 47.75 per cent of capacity for six months of 1934. Total output for six months of 1935 is 16,024,691 gross tons, which is 2.3 per cent less than the total of 16,402,554 gross tons produced in six months of 1934.

Other comparisons will be found in the accompanying table of 1934 and 1935 production. Additional figures coming to the Institute have caused revision and adjustment of all figures for 1934 and for the first five months of 1935 in this table.

	Monthly Production Calculated from Reports of Companies Making 97.91 per cent						Calculated daily production, all companies (gross tons)	Number of working days
	Open Hearth		Bessemer		Total			
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity		
1935								
Jan.	2,631,673	49.73	239,858	34.99	2,871,531	48.04	106,353	27
Feb.	2,553,429	54.28	224,336	36.82	2,777,765	52.28	115,740	24
Mar.	2,637,331	51.75	230,810	34.97	2,868,141	49.83	110,313	26
Apr.	2,408,588	47.27	231,916	35.14	2,640,504	45.87	101,558	26
May	2,381,061	44.99	254,796	37.17	2,635,857	44.10	97,624	27
June	2,020,406	41.23	210,487	33.17	2,230,893	40.31	89,236	25
6 mo.	14,632,488	48.17	1,392,203	35.38	16,024,691	46.70	103,385	155
1934								
Jan.	1,824,640	34.69	172,489	25.17	1,997,129	33.59	73,968	27
Feb.	2,036,071	43.55	175,873	28.87	2,211,944	41.86	92,164	24
Mar.	2,594,536	49.33	203,904	29.75	2,798,440	47.07	103,646	27
Apr.	2,678,582	55.00	257,482	40.57	2,936,064	53.34	117,443	25
May	3,067,874	58.33	331,620	48.38	3,399,494	57.18	125,907	27
June	2,776,891	54.83	282,592	42.81	3,059,483	53.44	117,672	26
6 mo.	14,978,594	49.29	1,423,960	35.96	16,402,554	47.75	105,145	156
July	1,369,584	28.12	119,869	18.89	1,489,453	27.06	59,578	25
Aug.	1,271,752	24.18	109,598	15.99	1,381,350	23.24	51,161	27
Sept.	1,151,362	23.64	117,615	18.53	1,268,977	23.05	50,759	25
Oct.	1,354,113	25.75	127,789	18.64	1,481,902	24.93	54,885	27
Nov.	1,478,566	29.19	132,059	20.01	1,610,625	28.13	61,947	26
Dec.	1,832,790	37.63	131,467	20.72	1,964,257	35.68	78,570	25
Total	23,436,761	38.68	2,162,357	27.39	25,599,118	37.38	82,312	311

Capacity percentages for 1935 are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934; for 1934 based on open-hearth capacity of 60,583,813 tons and bessemer of 7,895,000 tons on Dec. 31, 1933

Foundry Roll Call: 5080 in U.S., 470 in Canada; Mild Loss

FIVE thousand and eighty foundries of all descriptions in the United States and 470 in Canada answered "present" when *Penton's Foundry List* recently called the roll. For the United States this was a decline of 345 and for Canada a loss of 24 from the previous call, in 1930.

Every classification in the United States and all but three in Canada—electric, aluminum and exclusive nonferrous—suffered in the comparison of 1935 with 1930, which summarizes as follows:

	United States		Canada	
	1935	1930	1935	1930
Gray iron	3215	3573	365	397
Malleable	147	166	12	16
Steel	319	346	24	28
Electric	207	211	20	19
Nonferrous (exclusive)	1277	1407	79	72
Nonferrous (depts. of gray iron, steel, mall.)	1297	1637	207	225
Aluminum	2163	2276	231	223
Total*	5080	5425	470	494

*Adjusted for overlapping.

In percentages, the shrinkage in the United States, all classes considered, was 6.4 and in Canada 4.85. Gray iron was off 10 per cent in the States and 8.1 north of the border. The relatively greater decrease in the foundries melting nonferrous metals is believed accounted for by the discontinuance of small departments in plants principally casting other metals. The smallest decline was in the aluminum group.

In the 48 states, the Canal Zone, the Philippines, District of Columbia and Hawaii, 14 showed an increase in the number of foundries, 29 a decrease and the remaining 9 no change. The roll call for the leading 25 states for both 1935 and 1930 is as follows:

Standing	State	1935	1930
1	Pennsylvania	610	684
2	Ohio	555	595
3	New York	432	479
4	Illinois	392	425
5	Michigan	327	355
6	California	269	269
7	Wisconsin	227	241
8	Massachusetts	225	247
9	Indiana	220	234
10	New Jersey	194	217
11	Connecticut	135	144
12	Missouri	109	124
13	Minnesota	102	101
14	Alabama	98	98
15	Iowa	86	94
16	Texas	83	86
17	Washington	78	77
18	Tennessee	74	78
19	Virginia	72	69
20	Georgia	68	71
21	North Carolina	57	64
22	Maryland	53	53
23	West Virginia	49	47
24	Kansas	48	44
25	Oregon	46	48

As in the past, Chicago by a wide margin topped the distribution of foundries by cities:

Standing	City	Total Foundries 1935	1930
1	Chicago	158	163
2	Cleveland	116	113
3	New York (Brooklyn and Boroughs)	101	112
4	Los Angeles	99	91
5	Detroit	93	94
6	Milwaukee and West Allis	85	86
7	Philadelphia	78	83
8	Greater Boston	55	60
9	Cincinnati	53	56
10	St. Louis	52	60
11	Buffalo	50	48
12	Toronto, Ont.	47	49
13	Pittsburgh	41	48
14	Newark, N. J.	37	40
15	Minneapolis	36	33
16	Baltimore	35	33
17	Birmingham, Ala.	34	29
18	Seattle	33	30
19	Columbus, O.	32	32
20	Dayton, O.	30	33
21	Montreal, Que.	29	33
22	Erie, Pa.	30	34
23	Indianapolis	29	33
24	Denver, Colo.	28	27
25	San Francisco	27	35

Penton's Foundry List in a modernized loose-leaf form sells for $50, postpaid, through the Penton Publishing Co., 1213 West Third street, Cleveland.

Distribution of Foundries in the United States and Canada

Production

STEELMAKING snapped back sharply last week to 38 per cent, a gain of 7 points, and bettered by 1 point the week just prior to the holiday. In the major districts, Pittsburgh advanced 14 points to 34 per cent, Chicago 9½ to 42½ per cent, eastern Pennsylvania 5½ to 26½ per cent, and Youngstown 17 to 43 per cent. Schedules for this week indicate the rate will hold at this level, with the possibility of a slight increase. Details follow:

Steelmaking Operations

Percentage of Open Hearth Ingot capacity Engaged in 10 Leading Districts

	Week ended July 13	Change	Same week 1934	Same week 1933
Pittsburgh	34	+14	21	48
Chicago	42½	+ 9½	31	60
Eastern Pa.....	26½	+ 5½	22½	42
Youngstown...	43	+17	30	66
Wheeling	62	+22	30	90
Cleveland	44	+28	41	87
Buffalo	26	— 3	21	62
Birmingham..	30	None	20	77
New England	41	—15	61	83
Detroit	94	+16	93	55
Average.....	38	+ 7	30	57

Chicago—Rose sharply to 42½ per cent, compared with the average of 33 per cent during the preceding holiday week. Supported by a steady rate of steel buying, producers anticipate only small changes in operations during the coming week. Eleven of the district's 36 steelworks blast furnaces and two merchant stacks are active.

Buffalo—Off 3 points last week to 26 per cent, with 10 out of 38 open hearths active. The rate is expected to rise to 34 per cent this week, as additional open hearths are put on active schedule.

Youngstown — Jumped 17 points to 43 per cent last week, and tentative mill schedules indicate this rate will be held this week.

Detroit — Snapped back to 94 per cent last week, one producer operating eight out of nine, and another interest scheduling all eight.

Pittsburgh—Up 14 points to 34 per cent, recouping all the loss of the previous week. One leading interest operated at 25-27 per cent, while another scheduled operations at 38-40 per cent. Further advances are expected this week which may place the rate at over 35 per cent.

Nineteen out of 60 steelworks blast furnaces are in operation, although at least two producers are considering placing additional blast furnaces on schedule. One of these is a banked National Tube stack at McKeesport, Pa., which will resume either next week or the last week in July. Carnegie is operating eight, Jones & Laughlin five, Bethelehem three, and Pittsburgh Crucible Steel, Pittsburgh Steel and American Steel & Wire, one each.

Central eastern seaboard — Increased 5½ points to 26½ per cent, within 2½ points of the rate which prevailed just prior to the first week in July. Not much variation is in prospect for this week. Finishing operations also improved, following the holiday lull. Three additional puddle mills were put on by the Reading Iron Co. recently at its Danville, Pa., plant, increasing the number of employes there to the largest in more than three years, it is said. Miscellaneous steel buying is holding up fairly well in this district, although there are few outstanding orders of any description.

Birmingham—Held at 30 per cent last week, and no change is indicated for the immediate future.

Wheeling—Up 22 points to 62 per cent through last week, resumptions after the July 4 holiday having been sufficient to place the district rate ahead of the average before shutdowns. Twenty-three out 37 open-hearth furnaces are now on active schedule.

New England—Off 15 points to 41 per cent last week, with indications of a further drop this week when one steelworks will withdraw all open hearth operations for repairs until August 1.

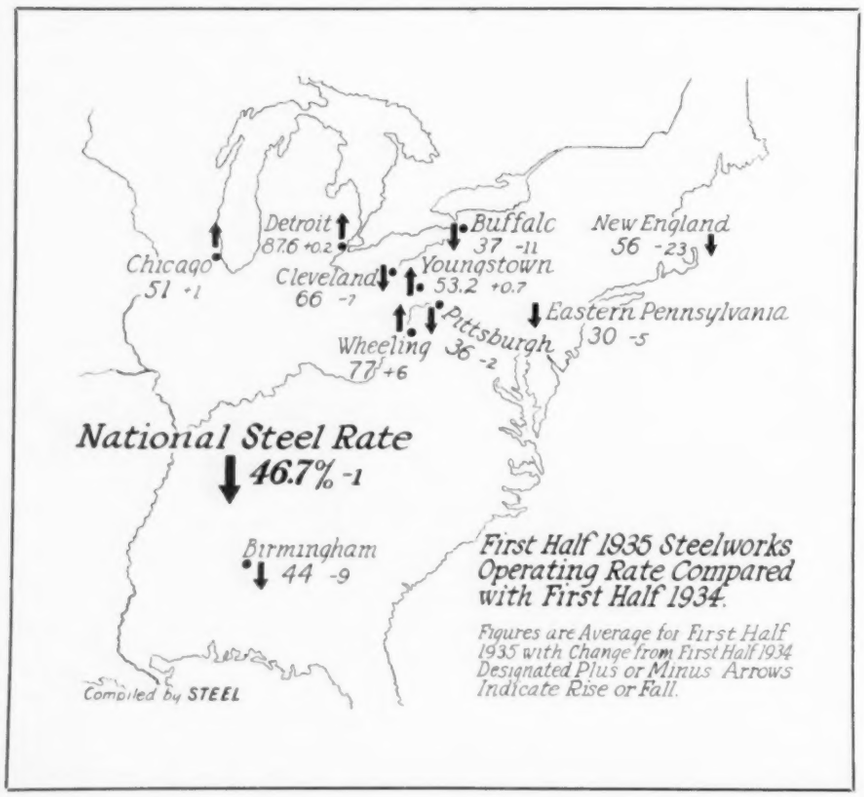
Cleveland-Lorain—Up 28 points to 44 per cent. National Tube Co., Lorain, resumed with nine open hearths, one more than in the week ended June 29. Corrigan, McKinney Steel Co. operated five last week, one less than in the week of June 29, and Otis Steel Co., three, also one less.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

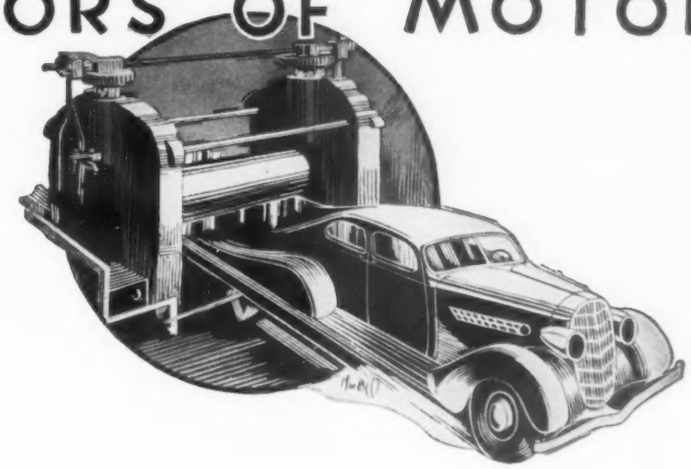
	1935	1934	1933	1932
Jan.	534,055	331,777	285,138	426,271
Feb.	583,137	385,500	275,929	413,001
March	668,056	588,209	256,793	388,579
April	591,728	643,009	335,321	395,091
May	598,915	745,063	455,302	338,202
June	578,108	985,337	603,937	324,746
6 mo.	3,553,999	5,678,895	2,212,420	2,285,890
July		369,938	701,322	272,448
Aug.		378,023	668,155	291,688
Sept.		370,306	575,161	316,019
Oct.		343,962	572,897	310,007
Nov.		366,119	430,358	275,594
Dec.		418,630	600,639	227,576
Yrl. adj.		19,907	44,283	5,160
Total		5,905,966	5,805,235	3,974,062



CORP. SHIPMENTS TAPER

Shipments of finished steel by the United States Steel Corp. in June were 578,108 tons, compared with 598,915 tons in May, a decline of 20,807 tons. The June figure compares with 985,337 tons in June, 1934. Shipments for six months of 1935 totaled 3,553,999 tons, compared with 3,678,895 tons in six months of 1934.

MIRRORS OF MOTORDOM



DETROIT

NEXT year, an increase of 15 to 20 per cent, or a total output of 4,000,000 to 4,200,000 units. Within three years, a new alltime top exceeding even 1929.

This is the basis on which one of the principal manufacturers of automobiles is laying its sales plans for 1936, and also its campaign for the short pull.

Nineteen thirty-two, it will be recalled, was the depression low for the industry, when only 1,370,000 units were assembled. In 1933 there was a rebound of 40 per cent, to 1,970,000. In 1934 recovery was even greater—43 per cent, lifting production to 2,750,000.

If 1935 reaches 3,500,000 jobs, as seems probable, the gain will be just under 30 per cent. Compared with the percentage rate of improvement since 1932 the prospective 15 to 20 per cent betterment for 1936 seems a little pale, but in units it would be the sizable number of 500,000 to 700,000.

Production in Retrospect

Assuming next year is a 4,000,000 to 4,200,000-car year, it will rate with 1925 and 1926 and fall short of 1928 and 1929. The vagaries of production of passenger cars and trucks in the United States since the department of commerce began compiling statistics in July, 1921, follow:

Year	Units
1921 (6 months)	861,008
1922	2,544,176
1923	4,034,012
1924	3,602,540
1925	4,265,830
1926	4,300,934
1927	3,401,326
1928	4,358,759
1929	5,358,420
1930	3,355,986
1931	2,389,730
1932	1,370,678
1933	1,920,057
1934	2,753,111
1935 (last half estimated)	3,500,000

Incidentally, when automobile manufacturers recently forecast a total of 3,500,000 units for 1935 they were not doing any mysterious crystal gazing. They merely took the average experience of the past decade—that the last half normally accounts for 40 per cent of a year's total—and added a few thousand for good measure on account of the early start on new models.

Supposing, as does the leading manufacturer of automobiles taking the soundings for 1936, that while the new deal may retard recovery it cannot block it, and that the basis for a generous credit inflation (alias good times) has already been laid, what class of car will profit chiefly? A good case can be made out for nearly all lines.

Manna for Medium-Price Cars

Considering that in the first six months Ford, Chevrolet and Plymouth have made 1,600,000 units out of the industry's total of 2,200,000, or 7 out of every 10, it looks like the low-price group is sweeping everything before it.

Yet, the greatest strides this year have been made in the price tier just above Ford - Chevrolet - Plymouth. Comparing first half production this year and last, Ford shows a gain of 60 per cent, Chevrolet 3 and Plymouth 10. But Oldsmobile is up 104 per cent, Nash 86, Pontiac 80, Dodge 60.

For 1935, General Motors is understood to have concluded, recovery would be far enough along to induce many thousands of buyers to pay $100 to $150 more for a job just above the low-price field, which the demand for Olds and Pontiac is bearing out. In the Chrysler line, the relative position of Dodge to Plymouth has improved this year, and Dodge is to Plymouth what Olds and Pontiac are to Chevrolet.

That General Motors still is of this opinion is evidenced by the large expenditures being made by both Olds and Pontiac to enlarge production. Olds expects to build 150,000 jobs this year, and double this number in 1936, for example.

Then there is a school of thought that maintains the phrase "low price" is no longer applicable to Ford-Chevrolet-Plymouth. These, it contends, are small editions of fine cars, considering engine performance, accessories and body styling and comfort.

While a 2-door standard Ford lists at $510, there has been a big swing to the deluxe series, and by the time he has selected a trunk job, painted checkerwork on his louvers, installed an extra windshield wiper and a radio, plus a few other accessories, the Ford buyer has over $700 invested.

There is a market vaster than any yet cultivated, some maintain, for a full size car equipped with only those accessories or fittings required for safety, having a top speed of perhaps 50 miles an hour and a gas consumption of 30 miles to the gallon, and priced below $500, delivered tax paid.

Plans Are Still Alive

Recently the magazine *Fortune* conducted a survey on such a car, pricing it at $300, asking the question, "Would you buy such a car instead of any car you can not get?" The answers were; Yes, 49.8 per cent; No, 40.7 per cent; Don't know, 9.5 per cent.

Automotive observers should tuck away in their memories the fact that Ford is understood to have such a car designed, Chevrolet still has blueprints of its Mercury filed, and Chrysler, while it writhes at any public discussion of it, has been doing some experimental work with a car smaller and lower priced than Plymouth.

It looks, too, as if the medium-price field can stage a comeback. Take, for example, Packard's $1000 car. The auxiliary assembly line (for convertible coupes) will shortly bring daily capacity up to 300, or a weekly total of 1500, practically all

of them the new model, whereas a year ago Packard was turning out 60 a week of its larger series. In the first half this year Packard assembled 20,900 units; a year ago, with only the large models to offer, 2900.

That has given Lincoln something to think about, resulting in a medium-price V-12, perhaps late in August, while Cadillac has been operating test cars powered by a V-8. Both the new Lincoln and the possible new Cadillac would be competitive with the Packard 120.

Also to be considered are a few makers which cover the area starting just above the low-price tier and reaching into the middle ground. Terraplane-Hudson in the first half assembled only 60,000 jobs against 65,000 a year ago, but its sales are larger than a year ago due to dealer carry-overs.

Buick's first half output, at 40,000, compares with 49,000 a year ago, but it has been handicapped by not having made any radical change in its larger line for 1935, and anyway, it has made considerable money turning out parts for Olds. Studebaker has just held its own with last year, at 30,000 jobs. Hupp shows a good increase, from 4300 last year to 6200 this year, and so do Reo and Graham.

Higher Brackets Suffer

In the higher rungs it has been a tough year. Lincoln has turned out only 1200 cars or 600 fewer than a year ago; Pierce-Arrow is off almost 1000, to 800 this year; Cadillac shows an increase from 10,000 last year to 12,000 this year, but take out LaSalle and it has done little.

But even the drab showings of the high and medium-price classes are not without some relieving high lights. Picture the country approaching something like 1929.

A vast army of persons who have never dreamed they could own an automobile might be tempted into a down payment on a $300 to $400 car. The present Fords, Chevrolets and Plymouths would hold the patronage of those wedded to a small fine-car. Those desiring a bit more refinement would be driving Olds, Pontiac, Dodge etc.

Some driving this class of car today would want to step up into a little larger Nash, Hudson or Buick. The whipped cream on this luscious cake would be the few—but sufficient—attracted by the swank of a Packard, Lincoln, Pierce-Arrow or Cadillac.

Detroit fairly drools at this picture, which it believes will be realized if anything like conservative government again prevails in Washington.

Encouraging as the prospect for 1936 appears, the automobile industry does not have to live on hope in the meantime. Last week production rebounded to 83,450 units, within 5000 of the total for the full week preceding the July 4 holiday.

Almost without exception, runs on 1935 models are being prolonged, chiefly in schedules of 5000 to 10,000 cars. This is resulting in small additional buys of steel and parts, although the cloth is being cut exceedingly close in order not to unbalance inventories.

Apparently, partsmakers and other suppliers also would do well to hold their commitments to the realities, for the labor situation is boiling underneath and may break through a few craters.

Last week it was reported here that an independent labor organization had been set up, designed by its promoters to take over membership of certain company unions. Now the American Federation of Labor is intensifying its activity, hoping to capitalize on the Wagner law before its constitutionality is determined.

It was also suggested in this department last week that a voluntary increase in wages might anticipate demands and handicap the organization efforts of outside unions. It is noteworthy that last week General Motors increased wages at its Muncie Products division at Muncie, Ind., where facilities for making transmissions were set up following the Chevrolet strike at Toledo in May.

These increases range up to 23 cents an hour and affect over 800 men. The interest to the supply and other industries is that automobile manufacturers might initiate a cycle of wage increases—and just at a time when certain automotive interests are pressing for an adjustment in the steel price structure.

While Oldsmobile last week snapped back to more than 4000 units, its pre-holiday gait, it put the finishing touches on a release, expected shortly, for 25,000 of the 1936 models.

Rumor now has the new Olds due about Sept. 1. In addition to a new grille and slight changes in the rear fenders, several bright parts will be added to the car.

That Buick is nearing the end of its run on the present jobs is evidenced by the start of the annual "sale" of officials' cars in various cities.

Buick and Chevrolet, as before noted, are the two complete General Motors lines to be completely overhauled this year, only minor styling changes being in prospect for both Olds and Pontiac. LaSalle already has had its changeover. Cadillac, in addition to a low-price job, will adopt the Fisher turret top.

Ford officially places its production of passenger cars and trucks in the United States and Canada in the first half at 810,700 units and its foreign output at 37,804. This leaves only 152,000 units to go to make good its boast of 1,000,000 cars this year. Since current weekly production is about 20,000 units, Ford will come up to July 26, when it expects to go down for two weeks, with close to 900,000 assembled.

To Revamp Foundry

During the shutdown Ford is expected to put finishing touches on its unique new foundry setup especially designed for the production of cast alloy pistons, clutch pedals and brake drums. For this and other foundry improvements, $675,000 has been expended.

These pistons are the wonder of foundrymen who have seen them. They are a special alloy steel mixture, poured from a battery of four new 5-ton electric furnaces, and are said to be about 1.40 carbon, 0.90 silicon and a little over 1 per cent copper.

The pistons have a convex top, which greatly increases the compression and hence also the power. They weigh about 10½ ounces, approximately the same as the aluminum pistons they are replacing, and have a wall thickness of 0.030-inch. The skirt is sharply cut away, for lightness.

Two heat treatments are given, followed by a final grinding operation. There are two oil rings. It is expected that as rapidly as production can be attained the switchover to this new type piston will be made. It probably will be featured in the campaign for 1936 models.

A few years ago Henry Ford was reported to be unkindly disposed toward foundries, which was evidenced

(*Please turn to Page 90*)

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,699
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,721
June	249,727	306,477	*340,000
6 Mo.	990,114	1,714,263	*2,240,817
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:	
July 6	59,380
July 13	83,450

WINDOWS OF WASHINGTON

WASHINGTON

SEVERAL interesting stories are going around in connection with the final decision on the question of who shall be greater—the federal trade commission or the NRA—with the former coming out on top.

Any number of conferences were held between James L. O'Neill, acting administrator of NRA, and Judge Ewin Davis, chairman of the trade commission, and other members and officials of the commission.

All of the stories given out were to the effect that progress was being made, and the inside story was to the effect that the officials of the two bodies had reached an agreement whereby they could co-operate.

Officials of the two bodies called on the President to make a report to this effect, when, lo and behold, the President announced that the whole matter would be handled by the trade commission.

Cummings Cracks Whip

There is no further explanation here than the fact that Attorney General Cummings sat in on the White House conference, and there is talk that he questions the constitutionality of even the resolution extending the life of NRA. It is being assumed that the President bowed to this decision, and therefore no more NRA.

The other side of the story is that Mr. O'Neill was sent to Washington by certain large business interests and his real job was to act as a receiver in bankruptcy for NRA, and that these particular interests wanted NRA closed. However, up to this time the President has not shown much inclination to please anyone in Wall Street and it is not being assumed that he did in this case.

Officials of the federal trade commission insist that they are not going to do any ballyhooing in connection with their trade practice conferences—perhaps it is not worth it.

No official statement has yet been issued by the commission in regard to either the applications for conferences which it has or in connection with any general policy on this subject.

It is stated definitely at the commission, but entirely unofficially, that the commission is going to go as far as it believes it can in co-operating with business and industry in working out new conference agreements.

In connection with its policy of secrecy as to applications that have been filed, it was pointed out last week that if these applications were made public some one or some group in any industry might spoil the whole conference plan by objections.

As the whole matter of working out any voluntary agreements now rests with the commission, it has been decided that it will not be necessary for the special committee appointed by NRA and the commission, which has been making a study of laws and decisions, to make any report.

It is understood that the commission already has investigators in the field in connection with some applications for conference rules which have been filed—in an effort to ascertain whether the industry as a whole really wants such a conference.

Following is a list of the trade practice rules in the iron and steel and allied industries which are now in effect at the commission, together with the dates on which the rules were consummated: Fabricated structural steel, in 1931; reinforcing steel fabricating and distributing trades, 1931; scrap iron and steel, 1932; solid section steel windows, 1931; steel office furniture, 1931; cut tacks, nail and staple industries, 1931, and fabricators of ornamental bronze and wire, 1932.

DATE SWEDISH PACT AUG. 5

President Roosevelt has proclaimed the new reciprocal trade agreement between this country and Sweden to become effective Aug. 5.

In this treaty the United States has reduced the import duty on sponge iron, muck bars, alloy steels, unfinished structural steel, and round wire from Sweden.

FUTILITY OF OPPOSITION TO TAX PROGRAM EVIDENCED

Tax hearings were held all of last week by the ways and means committee of the house in connection with the new revenue bill. There is every indication, as this is written, that the hearings will be completed by the time this issue reaches its readers.

There was a peculiar reaction by business to the hearings. While a number of business organizations applied for time to be heard against increased corporation taxes, very few turned up when their names were called, evidently being of the opinion that what they had to say would not weigh much against the administration's desire for higher corporation taxes. At any rate, few business men or industralists appeared against the plan.

Chairman Doughton of the ways and means committee stated the latter part of last week that he hoped the committee would be able to put a bill into shape by the end of this week, although he said it might take a few days longer.

At the same time, Sen. Pat Harrison, chairman of the senate finance committee, announced that his committee would not begin hearings until the ways and means committee has at least drawn up its bill. This, he pointed out, would give witnesses before the senate committee something to shoot at.

Secretary of the Treasury Morgenthau, appearing before the house committee, presented widely varying suggestions for the proposed taxes. Under his suggestions, the minimum

annual yield would be $118,000,000, the maximum $901,500,000; the minimum yield per year on corporation incomes would be $67,000,000, and the maximum $102,000,000.

Regardless of whether congress as a whole will take the same stand, members of the ways and means committee are determined to write the bill, taking up only the three suggestions made by the President—namely levies on high inheritances, on high incomes, and a graduated corporation tax to replace the present flat rate.

Of course, "riders" will be attached to the bill as it passes, first the house and then the senate, but there is every indication that the administration forces will be able to hold the bill down to the desires of the President.

A nation-wide drive against the administration's tax proposals has been begun by the chamber of commerce of the Unnted States. A report has just been made by the committee on federal finances of the national chamber which characterizes the proposals as destructive and confiscatory, and warns that present tax rates have passed the point of maximum productivity and that higher rates will consequently accelerate the movement toward progressively diminishing returns. The higher rates, it is further contended, will discourage new business enterprises and retard recovery.

HOUR-WAGE POSSIBILITIES JAR GOVERNMENT BIDDERS

The crisis has passed now, but steel interests and other bidders for government supplies of one kind or another have been considerably disturbed at a circular recently issued by the procurement division of the treasury department, and officially endorsed by both the secretary of the treasury and Admiral C. J. Peoples, director of procurement.

The circular made it obligatory upon the bidder, if legislation passed, to put into effect labor provisions of his former codes. The comptroller general, however, has just declared that this is not legal.

The director of procurement recommended, until such time as proposed legislation may be acted upon by congress, that in lieu of code compliance requirements stipulated in an executive order and suspended temporarily after the United States Supreme Court decision, all invitations to bid for supplies, materials or construction projects of any character include the following clause:

"Bids are requested on the basis that if subsequent legislation shall require observance of minimum wages and/or maximum hours of employment and/or limitation as to the age of employes, in the performance of governments contracts, any contract entered into shall be subject to modification to accord with such statutory requirements to the extent authorized or required by law."

PROSPECT FOR FABRICATORS IN WRA JOBS BRIGHTER

Judging from recent developments, structural steel fabricators may yet participate substantially in grade crossing elimination work as a part of the work relief program.

Because the use of reinforced concrete appeared to offer greater opportunities for local labor, many projects were earmarked for concrete. But it developed that this entailed revision of plans already completed, with ensuing delay, and it also developed that in a number of cases steel would be necessary for proper head room.

Consequently, in line with the President's desire to expedite public works and spend as much of his $4,000,000,000 as possible by next July 1, much of the original program requiring structural steel is expected to go through.

Approximately $200,000,000 is to be spent on grade crossings, and $300,000,000 on roads, a third of the latter to be a carryover from previous appropriations.

An important announcement in regard to the policy of purchasing materials is looked for shortly. Indications are that materials, instead of being purchased by Washington in bulk from producers, will be placed for specific jobs. Cement, of course, can be purchased in a blanket order but structural shapes and reinforcing bars apparently will follow usual market routine.

SLOW IN NAMING LABOR BOARD

Nothing is being done at present by the old national labor relations board, or what is left of it. Executives there are simply "making time" —waiting for the President to nominate a chairman and other members of the board which will be set up as called for by the new Wagner labor relatons law.

It is expected that such nomination will be made shortly, and that the board will be created with many of the old employes as well as those of the old steel labor relations board and the textile board. Under the act, the new board would be able to set up individual boards for different industries, but of course nothing is known as yet as to whether the new members of the board will consider this or not.

JUNIOR COMMERCE OFFICIALS SEEK NEW DEAL FOR SELVES

"Uncle Dan" Roper, at the department of commerce, is having considerable trouble with his helpers these days.

First, it was his business council, then it was his assistant secretary for shipping, and now John Dickinson, another assistant secretary of commerce, one of the original New Deal brain trusters, is resigning to become an assistant attorney general in charge of anti-trust prosecution.

Of course it is being vigorously denied in the department of commerce, but there are well authenticated reports that Mr. Dickinson has not been getting along so well with the politicians in the department.

However, on the surface all is lovely and this will be a wonderful opening for the former college professor of the University of Pennsylvania and Harvard. Also, Mr. Dickinson was a one-time law partner of Senator McAdoo of California.

NRA

RW. SHANNON, who was NRA administrator in charge of the steel code and formerly with the American Sheet & Tin Plate Co., has been designated to make a fact-finding survey under the direction of the new NRA board of review.

While no official statement has been made public at NRA, it is understood that Mr. Shannon will be assisted in this work by an active staff of eight to ten persons, in addition to which he will confer with economists and engineers, including some of the experts outside of NRA who participated in drawing up the recent NRA basing point report.

While definite plans have not yet been drawn up for the survey, it is understood that Mr. Shannon contemplates taking up the position of the steel industry before the code, the effects of the industry under the code, and the situation since the annulment of the code.

It is understood that the survey will take several months and that the old basing-point question will again be surveyed. Mr. Shannon is anxious for the co-operation of the industry in obtaining facts, and it is reported that an industrial expert will be appointed to contact the industry.

Transportation

FREIGHT car loadings in Allegheny district, including Pittsburgh, during the third quarter are expected to show an increase of 7.5 per cent over the same quarter of last year. Shippers in that district estimate they will need 119,983 cars for shipping steel during the present quarter, compared with 94,104 cars a year ago. It is interesting to note that shippers estimated they would need only 103,095 cars during the first quarter of 1935, but actually loaded 115,793 cars.

Industrial Men in the Day's News

L. A. Prescott, Vice President in Charge of Engineering Division, Blaw-Knox Co.

He has held a number of high positions with this company for the past eighteen years.

Prior to 1917, he was active in engineering work for the government and other interests.

He has managed the Blaw-Knox Baltimore plant, and until recently was chief engineer of the company.

L. A. PRESCOTT, recently advanced to the post of vice president in charge of the engineering division of Blaw-Knox Co., Blawnox, Pa., has been identified actively with the company since 1917. STEEL recently noted (June 24, p. 25) both Mr. Prescott's appointment and E. J. McDonnell's appointment as vice president of the company.

Mr. Prescott is a graduate of Michigan State College of Agriculture and Applied Science, East Lansing, Mich., with a degree of bachelor of science in civil engineering. He was employed as a government engineer and was identified with various other engineering activities until 1917, at which time he entered the Blaw-Knox employ.

Since that time, he has held the position of works manager at the Baltimore plant, followed by an appointment as assistant vice president in charge of the company's structural and tower department, and more recently, chief engineer.

♦ ♦ ♦

George Batty has resigned from the Crucible Steel Casting Co., Lansdowne, Pa., and will engage in consulting work for foundries and users of steel castings. In 1927 and 1928 he was engaged in consulting work in Detroit, and following that was director of the Steel Castings Development bureau, Philadelphia.

♦ ♦ ♦

Ed. W. Ferry has launched the E. W. Ferry Screw Products Co., 8219 Almira avenue, Cleveland, now in production on cap and set screws, acorn nuts and connecting rods. He recently resigned as vice president, secretary and treasurer of the Ferry Cap & Set Screw Co., Cleveland, but continues as a director, though no longer active.

G. S. Tighe, formerly of the Russell Iron Corp., Baltimore, is sales manager of the new Ferry company. Ray F. Vixler, formerly with Ferry Cap & Set Screw, is factory manager.

♦ ♦ ♦

William L. Newlands, formerly superintendent of No. 2 foundry, American Engineering Co., Philadelphia, and the Walker Foundry & Machine Co., Roanoke, Va., has been appointed plant superintendent of the Spring City Foundry & Machine Co., Spring City, Pa.

♦ ♦ ♦

P. L. Price, for many years treasurer and general manager of Irving Iron Works Co., New York, is now associated with the George A. Just Co., fabricator and erector of structural steel, Chrysler building, New York, as assistant treasurer and general manager. His headquarters will be at the New York plant of the company, 44 Vernon boulevard, Long Island City.

♦ ♦ ♦

Dr. C. R. Payne, from 1928 until recently associated with the research staff of the Mellon Institute of Industrial Research, Pittsburgh, is now affiliated with the technical and sales staff of the Atlas Mineral Products Co., Mertztown, Pa. He will supervise production of acid and corrosion-resisting compounds for use in constructing vats and floors, and in jointing pipe.

♦ ♦ ♦

Arch Miller has been appointed packing representative in the Pittsburgh district for the mechanical goods division of United States Rubber Products Inc., New York.

♦ ♦ ♦

R. M. Beaton has been appointed district sales manager at New York, in charge of metropolitan New York and northern New Jersey, for the Universal Atlas Cement Co., subsidiary of the United States Steel Corp. He has been with the organization nine years, serving as salesman for the Atlas Lumnite Cement Co. and later as district sales manager at Albany, N. Y.

B. J. Whittaker has been named district sales manager at Albany, succeeding Mr. Beaton. Joining the company in 1929, prior to that he was field engineer for the Portland Cement association in charge of structural and concrete products promotion.

C. L. Whalley has been named assistant district sales manager at Newark, N. J. for Universal Atlas, under direction of Mr. Beaton. With the company for 16 years, he will now have charge of northern New Jersey territory.

♦ ♦ ♦

Martin A. Rooney, former vice president of the N. B. Noland Co. Inc., Newport News, Va., distributor of plumbing fixtures, has resigned to become eastern regional manager for the plumbing division of the Briggs Mfg. Co., Detroit. Previous associations also include Pierce, Butler & Pierce Mfg. Corp., New York; American Radiator Co., Buffalo; and Hart & Crouse Co., Utica, N. Y. In his new post he will supervise sales of drawn metal plumbing ware in New York state and New Jersey.

George A. McCrary, for over 20 years associated with Standard Sanitary Mfg. Co., has been appointed regional manager for the Briggs plumbing division for southern territory, including Alabama, Mississippi, Florida, South Carolina, Georgia, Tennessee, Oklahoma, Arkansas and Texas.

A. S. Ault, formerly ceramic control engineer for the General Electric Co. at Erie, Pa., and later with the Frigidaire Corp., Dayton, O., has been appointed control engineer in charge of ceramics in the new Briggs division, with plant at Hamtramck, Mich.

♦ ♦ ♦

Dr. Irving Langmuir, associate director of the research laboratory

of General Electric Co., Schenectady, N. Y., and Nobel prize winner, has been elected to foreign membership in the Royal society, England, considered one of the highest honors that can be bestowed by British scientists on fellow workers in other countries. The distinction is limited to 50 persons throughout the world.

♦ ♦ ♦

A. U. Smith, 4916 Abbott avenue, Dallas, Tex., has been appointed representative in Texas, Oklahoma and Arkansas for Chisholm-Moore Hoist Corp., Tonawanda, N. Y.

♦ ♦ ♦

Myron C. Taylor, chairman, United States Steel Corp., 71 Broadway, New York, returned July 9 after several weeks abroad visiting the Corporation's European offices and spending some extra time in Italy.

Institute

DIRECTORS of the American Iron and Steel institute held their monthly meeting in New York Thursday without announcing any definite future policy on a pricing plan or a voluntary code, principally embracing trade practices, for submission to the federal trade commission. It appears to be the consensus of opinion among producers that no such code will be filed.

The Institute has received from Toledo, O., a brief relating its grievances and disadvantages resulting from differentials conceded to Detroit on certain steel products (July 8, p. 15). No action has been taken by the Institute and there is some doubt whether it could act officially, now that the code is out. This simmers any relief for Toledo down to action by an important producer, to be followed by others.

Died:

HARRY GILLETTE, vice president of the Detroit Steel Products Co., Detroit, in that city, July 6. Born in England, he came to this country at an early age and eventually became district manager at Cleveland for the Johns-Manville Co. Later he organized the Gillette Asbestos Co. in Cleveland. Following his development of a new type of steel roof deck known as Holorib, he was bought out by Detroit Steel Products and made an officer of the latter company. For many years he was active in civic affairs of Cleveland and suburbs.

♦ ♦ ♦

John Berg, 69, former president of the Metal Specialties Mfg. Co., Chicago, in that city recently.

♦ ♦ ♦

Walter Warbinda, 40, controller for the Stewart Die Casting Co., Chicago, in that city, July 3.

♦ ♦ ♦

John O. Klingelhofer, 62, director of Pittsburgh Bridge & Iron Works, Rochester, Pa., in Pittsburgh, July 5.

♦ ♦ ♦

Theodore J. Pagel, 54, inventor of the Pagel rotary pump and for years president of the Pagel Rotary Pump Mfg. Co., Minneapolis, July 1.

♦ ♦ ♦

Roscoe C. Skiles, 56, chairman and vice president of the board, Ohio Seamless Tube Co., Shelby, O., in St. Michaels, Md., July 1. He was active in legal and banking circles of Shelby for many years.

♦ ♦ ♦

Alexander S. MacPhee, 81, well-known Elizabeth, N. J., shipbuilder, in Syracuse, N. Y., July 2. He retired two years ago from the Nixon Shipbuilding Co., after being with this organization for 15 years.

♦ ♦ ♦

W. H. Stackhouse, 70, for 35 years a partner and general manager of French & Hecht, Springfield, O., farm implement manufacturer, and a former friend and counsellor to the late President Warren G. Harding, in Cleveland, July 4.

♦ ♦ ♦

J. C. Widdicombe, 67, until his retirement last May chief draftsman for the Phoenix Bridge Co., Phoenixville, Pa., in that city recently. He had been associated with Phoenix Bridge and the former Phoenix Iron Co. for close to 50 years.

♦ ♦ ♦

Benjamin L. Stearns, 48, associated with the purchasing department of the Budd Wheel Co., Detroit, July 7, in an automobile accident near Toledo, O.

James G. Upham, 23, district manager at Detroit for Geometric Stamping Co., Cleveland, in the same accident.

♦ ♦ ♦

William H. Powell, 68, electrical engineer, Allis-Chalmers Mfg. Co., Milwaukee, July 8. Born in Leicester, England, he came to America in early youth. He was graduated from Cornell university in 1890 and for 18 years was manager of the Bullock Mfg. Co., Norwood, Cincinnati, going to Milwaukee when the Bullock works became affiliated with Allis-Chalmers in 1908.

A Half Century of Building Drills

AUGUST H. TUECHTER, president of the Cincinnati Bickford Tool Co., Cincinnati, on Saturday, July 13, celebrated the fiftieth anniversary of his connection with the machine tool industry.

Born in Cincinnati in 1869, he went to work in 1885 when the death of his father made it necessary for him to become self-supporting. He started as office boy with Henry Bickford, manufacturer of upright drills, at the same time going to night school.

He progressed, and on the formation of the Bickford Drill Co. became general manager, serving subsequently in the same capacity for the Bickford Drill & Tool Co. and the Cincinnati Machine Tool Co. When the latter company in 1909 took over the Bickford Drill & Tool Co. and reorganized as the Cincinnati Bickford Tool Co., Mr. Tuechter became president and continued in that capacity.

Long a leading figure in Cincinnati's industrial activities, he is vice president of the Ahrene-Fox Fire Engine Co., vice president of the Cincinnati Rubber Mfg. Co., vice president of the First National Bank of Norwood, secretary of the Factory Power Co., director of the Lincoln National Bank, and director of the Clyffside Brewing Co.

He is president of the Industrial association of Cincinnati, a trustee of the Ohio Manufacturers association, and has taken a leading part in philanthropic and public welfare activities in Cincinnati throughout his career.

Mr. Tuechter is a past president of the National Machine Tool Builders' association, an associate member of the American Society of Mechanical Engineers, and a member of the administrative council of the National Metal Trades association.

August H. Tuechter

EDITORIAL

Steel Is Shifting Base, But Pennsylvania Still Dominates

POSSESSORS of the 1935 edition of the *Directory of Iron and Steel Works of the United States and Canada*, published late in June by the American Iron and Steel institute, doubtless have learned by this time to recognize the value and convenience of the tables of annual capacities by products, companies and states which appear on pages 368 to 414, inclusive.

The summaries of capacities make it possible to obtain quickly and with little effort important data which hitherto could be assembled only by a laborious compilation of figures from numerous, obscure sources.

A casual study of these tables impresses the reader with several interesting conclusions as to the geographical distribution of the production facilities of the iron and steel industry. First is the realization that the mills and furnaces are scattered more widely throughout the states than previously. Second is the conviction that in spite of this tendency of the industry to expand into new territory, Pennsylvania still holds its dominant position as leader not only in the volume of its capacity but also in the diversity of its products.

Turning to primary capacity, we find that the 10 leading states, ranked according to their annual capacity for producing pig iron and ferroalloys, are as follows: Pennsylvania, Ohio, Illinois, Indiana, New York, Alabama, Maryland, Michigan, West Virginia and Colorado. The 10 with the greatest capacities for steel for ingots and castings are Pennsylvania, Ohio, Indiana, Illinois, New York, Maryland, Alabama, Michigan, West Virginia and Kentucky.

Pennsylvania, Ohio, Indiana and Illinois Are Far Ahead in Iron and Steel Capacity

Pennsylvania, with 17,924,040 tons or 33 per cent of the nation's total of 52,715,100 tons of capacity for producing pig iron and ferroalloys, and with 23,421,004 of 71,431,089 tons or nearly 33 per cent of the total steelmaking capacity, is far ahead of the field in tonnage. Ohio has 22 per cent of the pig iron capacity and 22 per cent of the steelmaking capacity of the nation. Illinois' capacity is 10.7 per cent of the national total for pig iron and 10.3 per cent of the total for steel. Indiana's blast furnaces account for 9.6 of the pig iron capacity and its steelworks represent 11.8 per cent of the steelmaking capacity. The remaining states lag far behind in point of volume.

The diversity of capacity according to rolled steel products is indicated in the accompanying table, which shows the five ranking states for each of the 38 products listed in the directory. Significant of Pennsylvania's firm hold on first place for diversified mill facilities is the fact that

RANK OF FIVE LEADING STATES IN FINISHED ROLLED STEEL CAPACITIES

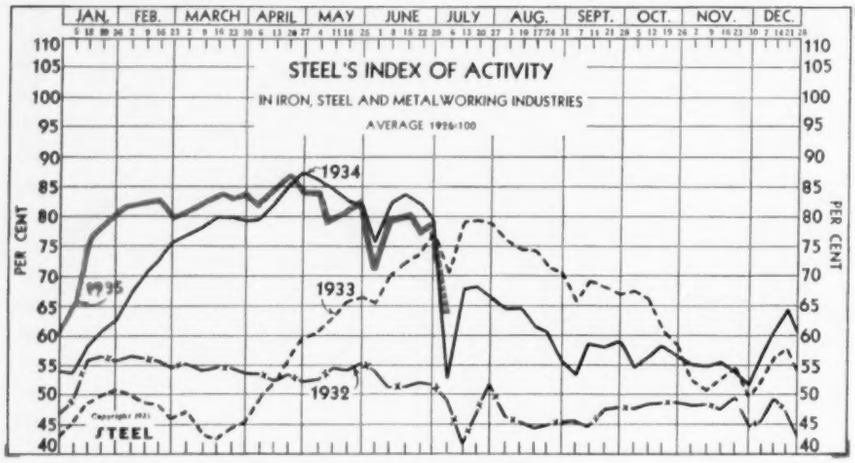
Rank	1	2	3	4	5
Structural shapes, heavy	Pa.	Ill.	N. Y.	Ind.	Mo.
Structural shapes, light	Pa.	Ohio	N. Y.	Ind.	Cal.
Rails, 60 lbs. or less	Pa.	W. Va.	Ill.	Ohio	Colo.
Rails, all other	Pa.	Ind.	Ala.	Colo.	N. Y.
Sheet piling	Pa.	N. Y.	Ind.	Ill.	....
Splice bars, tie plates	Pa.	Ind.	Ala.	Ill.	Colo.
Plates, sheared	Pa.	Ill.	Ind.	Md.	Ohio
Plates, universal	Pa.	Ohio	Ind.	Ill.	Md.
Black sheets, hot rolled	Ohio	Ind.	Pa.	Ill.	Ky.
Black sheets, hot rolled annealed	Ohio	Pa.	Ky.	Ind.	Mich.
Hoops, cotton ties, bales	Ala.	Pa.	Ohio	Ill.	Ga.
Hot rolled strip	Ohio	Pa.	Ind.	Ill.	Mich.
Black plate	Pa.	Ind.	Ohio	W. Va.	Md.
Bars, other than concrete	Pa.	Ohio	Ind.	Ill.	N. Y.
Bars, concrete	Pa.	Ind.	Mo.	Cal.	Ill.
Wire rods	Pa.	Ill.	Ohio	Ind.	Ala.
Skelp	Ohio	Pa.	Ind.	Md.	W. Va.
Blanks, billets for seamless tubes	Pa.	Ohio	Wisc.	Mich.	....
Rolled wheels	Pa.	Ind.	....	....	....
Rolled blooms, billets for forging	Pa.	Mich.	Ohio	Ky.	Ind.
Miscellaneous finished hot rolled products	Pa.	Ill.	Me.	Mo.	Ind.
Butt-weld pipe	Pa.	Ohio	Ind.	Ill.	W. Va.
Lap-weld pipe	Pa.	Ohio	Ind.	Md.	W. Va.
Seamless tubes	Pa.	Ohio	Ind.	Wisc.	Mich.
Electric-weld pipe	Ohio	Pa.	N. Y.	Cal.	Ill.
Galvanized pipe	Pa.	Ohio	Ill.	Ind.	W. Va.-Md
Cold rolled sheets	Ohio	Ind.	Ky.	Mich.	Pa.
Galvanized sheets	Ohio	Ind.	Pa.	Ala.	Ky.
Long terne sheets	Ohio	Pa.	Ky.	Ind.	W. Va.
Cold rolled strip	Ohio	Pa.	Mich.	Conn.	Ill.
Tin and terne plate	Pa.	Ind.	Ohio	W. Va.	Md.
Cold drawn bars	Pa.	Ohio	Ill.	Ind.	Mich.
Plain wire	Pa.	Ill.	Ohio	Mass.	Ind.
Galvanized wire	Pa.	Ill.	Ala.	Ohio	Ind.
Barbed wire	Pa.	Ill.	Ala.	Ohio	Ind.
Fence	Ill.	Pa.	Ala.	Ind.	Ohio
Nails and staples	Pa.	Ill.	Ohio	Ala.	Ind.
Bolts, nuts, spikes, rivets, etc.	Pa.	Ohio	Ill.	Mich.	Mo.

it leads in 27 of the 38 products. Ohio holds nine firsts, and Alabama and Illinois each has one.

It is noteworthy that the principal products in which Pennsylvania does not lead are the light, flat rolled items. Ohio's leadership is largely in hot and cold rolled strip, hot rolled and hot rolled annealed black sheets, galvanized sheets and cold rolled sheets. Indiana, Illinois, Kentucky, Michigan and Pennsylvania also possess large capacities for these active products. The Keystone state holds only one first in important, light, flat rolled steel products; it is in tin plate.

All of this reflects the gradual shift of capacity for the newer forms of rolled steel into districts which are closer to the large consuming centers.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined* 14.1 *points to* 64.3 *in the week ending July* 6:

Week ending	1935	1934	1933	1932
May 11	79.3	84.4	62.5	54.3
May 18	80.5	82.4	65.2	55.1
May 25	82.8	81.9	66.1	54.2
June 1	71.9	75.7	65.3	51.0
June 8	79.3	82.3	69.9	51.1
June 15	80.0	83.6	72.1	51.8
June 22	77.3	81.8	73.9	51.6
June 29	78.4†	79.4	77.0	49.2
July 6	64.3*	52.3	71.4	41.7

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings, power output and auto assemblies each* 20.

Rebound from Holiday Low Brightens Business Outlook

COMPARISON of the business record for the first two weeks of July with that for the corresponding weeks of last year is distinctly encouraging. The drop in activity caused by the observance of Independence day was much less severe and the rebound in the post-holiday week was more vigorous this year than in 1934.

Last year the rate of steel operations dropped from 46 to 22 per cent, whereas this year the decline was from 37 to 31 per cent. A year ago the rebound was from 22 to 30 per cent. This year it is from 31 to 36 or 37 per cent, which is virtually a full recovery.

In 1934 automobile assemblies slipped from 80,936 to 30,493 in the holiday week; this year the shrinkage was from 89,037 to 59,380. This reflects a much stronger current situation in automobile output.

Power output last year dipped from 1,688,200,000 to 1,555,800,000 kilowatt hours, while in 1935 the loss was from 1,772,100,000 to 1,655,400,000 units. Revenue freight car loadings receded from 644,600 to 519,800 a year ago and from 600,200 to slightly below 500,000 (estimated) this year.

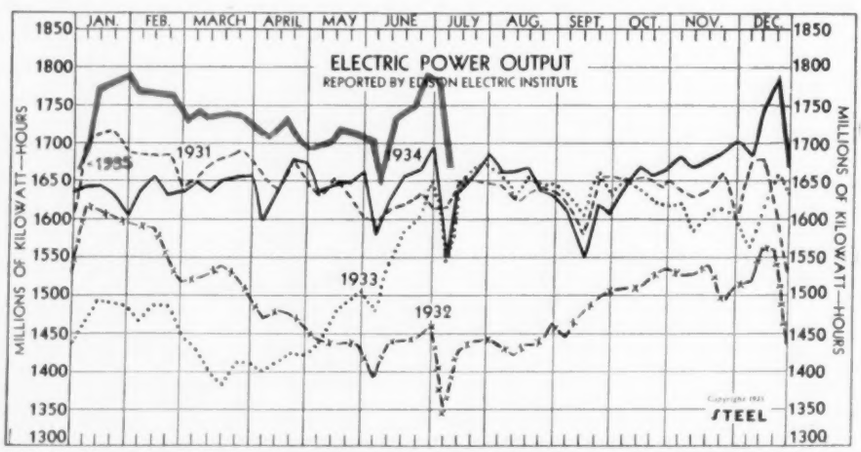
STEEL's index of industrial activity, which reflects the movement of these four barometers, in 1934 plunged precipitously from 79.4 to 52.3 and recovered to 67.8. In 1935, from 78.4 in the last week of June, it receded to 64.3 in the holiday week and probably will rebound into the middle seventies for the week ending July 13.

This evidence of buoyancy in a normally dull season of the year and in the face of a confusing situation at Washington lends a bullish aspect to the business outlook.

Million Kw.-Hr.

1935

July 6	1,655
June 29	1,772
June 22	1,775
June 15	1,743
June 8	1,724
June 1	1,629
May 25	1,696
May 18	1,700
May 11	1,701
May 4	1,698
Apr. 27	1,673
Apr. 20	1,701
Apr. 13	1,725
Apr. 6	1,700



Million Kw.-Hr.

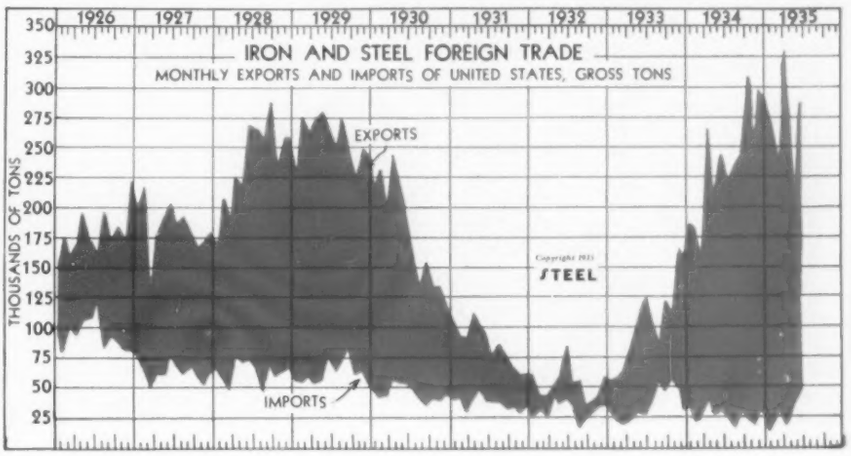
1934

July 7	1,556
June 30	1,688
June 23	1,675
June 16	1,665
June 9	1,655
June 2	1,576
May 26	1,655
May 19	1,649
May 12	1,643
May 5	1,632
Apr. 28	1,669
Apr. 21	1,673
Apr. 14	1,642
Apr. 7	1,616

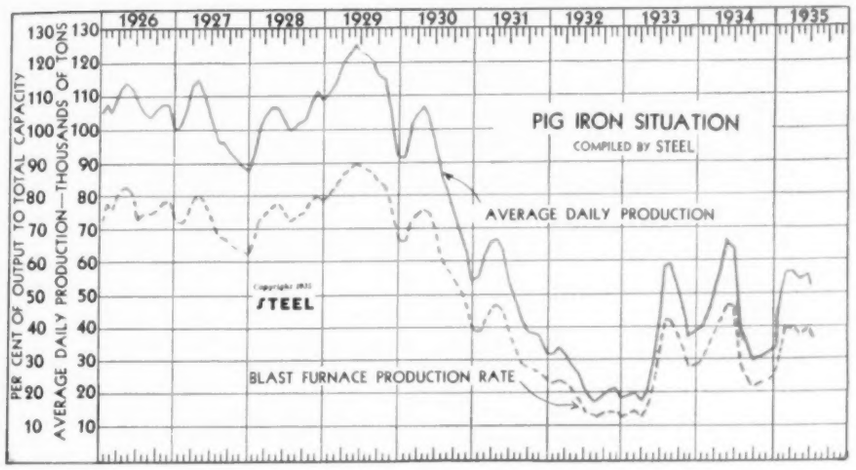
Steel Exports Register Sharp Recovery in May

Gross Tons

	1935		1934	
	Imports	Exports	Imports	Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,260
April	28,866	205,336	26,862	201,539
May	47,719	286,598	29,465	241,753
June	.....	.....	24,848	219,406
July	.....	.....	17,676	233,186
Aug.	.....	.....	32,418	242,947
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764



Iron Output and Furnace Rate Declines in June

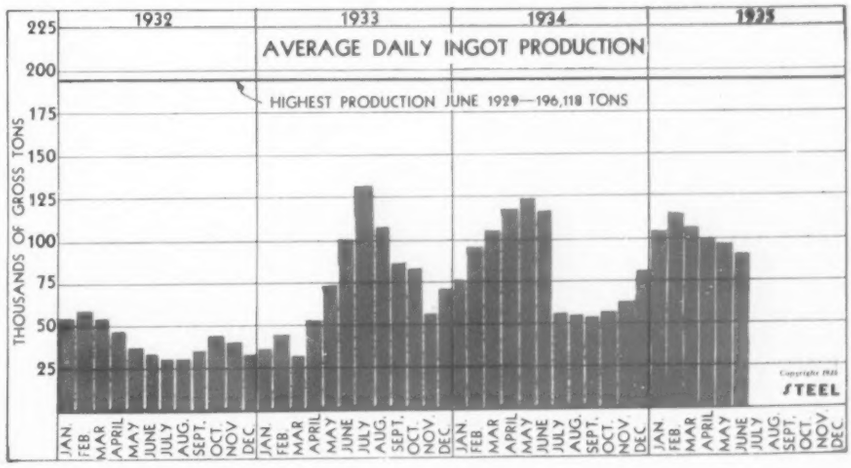


	Daily Average		Blast Furnace Rate	
	1935	1934	1935	1934
Jan.	47,692	39,537	34.2	28.3
Feb.	57,686	45,385	41.4	32.5
Mar.	57,120	52,438	41.0	37.5
April	55,719	57,873	40.0	41.4
May	55,986	66,370	40.2	47.5
June	51,949	64,563	37.2	46.3
July	.....	39,630	.....	28.4
Aug.	.....	34,199	.....	24.5
Sept.	.....	29,969	.....	21.5
Oct.	.....	30,689	.....	22.1
Nov.	.....	31,930	.....	22.8
Dec.	.....	33,161	.....	23.7

June Steel Ingot Production Continues Decline

Gross Tons

	1935	1934	1933
Jan.	106,353	73,968	39,110
Feb.	115,740	92,164	44,709
March	110,313	103,646	33,268
April	101,558	117,443	53,817
May	97,624	125,907	73,201
June	89,236	117,672	98,632
July	.....	59,578	126,734
Aug.	.....	51,161	106,058
Sept.	.....	50,759	87,811
Oct.	.....	54,885	80,188
Nov.	.....	61,947	58,507
Dec.	.....	78,570	71,944



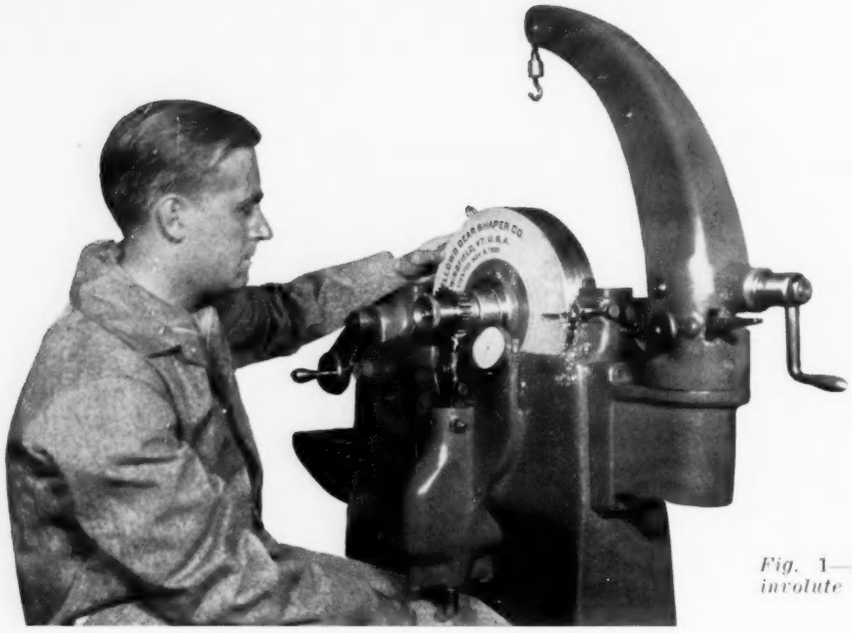


Fig. 1—Inspector "rolling" an involute tooth on involute testing machine

Special Machines and Fixtures Provide Check on Accuracy of Gears

BY ROBERT BEARDSLEY and D. T. HAMILTON

Recently improved methods for testing accuracy of gears have included the development of a number of specialized machines which quickly and precisely indicate even small errors of shape and contour. Some of these machines are described and illustrated in the accompanying discussion which is abridged from a paper presented at the recent annual meeting of the American Gear Manufacturers association in Wilkinsburg, Pa. Robert Beardsley, Jones & Lamson Machine Co., Springfield, Vt., is author of the paper, in collaboration with D. T. Hamilton, Fellows Gear Shaper Co., Springfield

GEARS are employed principally for transmitting motion from one shaft to another, and to fulfill this function successfully, the tooth action must be smooth and continuous, requiring: That the line of action be longer than the base pitch; that the teeth be evenly spaced; that the mating tooth shapes be conjugate; that there is no interference; and that the contacting tooth surfaces have a smooth finish. These are the principal requirements to consider in the production of accurate gears.

Elaborating on these requirements: The teeth should be of sufficient length to assure a line of action which is equal to or greater in length than 1¼ times the base pitch. The proportions of this tooth element are a matter of design, although certain manufacturing errors can defeat its successful obtainment; such, for example, as too much tip relief, irregular tooth spacing, errors in gear mounting and the like.

Uneven tooth spacing causes the driven gear to accelerate and decelerate alternately as the mating teeth come into and go out of mesh. In other words, the motion is not smooth and continuous.

Tooth shapes which are not conjugate have a similar effect, and this is especially so if the active profile is not of sufficient length to obtain a line of action that is greater than the pitch.

Interference is contact of the teeth at some other point than along the line of action and can result from improper tooth design, inaccurate cutting, and mounting gears at shorter center distance than that intended. It is a serious source of vibration and hence contributes to noisy operation.

In recent years efforts have been made to produce gears having a smooth contacting tooth surface. It is generally appreciated that irrespective of the accuracy of the tooth elements, the condition of the tooth surface has a direct bearing on the smooth operation and life of the gears.

Slipping Makes Vibration

If we operate two gears together, it will be noticed that there is little rolling action between the teeth. In fact, theoretically speaking, there is only one point where true rolling is present and that is directly on the pitch line. At all other points the teeth slip upon each other. Therefore, if the tooth surfaces are not smooth, the action of the gears is such that considerable vibration is set up as they pass through mesh, due to sliding over roughened surfaces. While no definite limits have been established for the finish on the surface of gear teeth, efforts are being made to determine some standard for rejecting gears, which would

prove unsatisfactory under operating conditions.

While it is not the purpose here to deal with the subject of machining processes nor with the question of noise, these two points nevertheless are closely allied with the question of inspection of tooth elements. It is possible with present-day cutting equipment and cutting tools to produce gears which have a fairly smooth and accurate tooth surface; but since most gears, especially those for high-speed operation, must be given some sort of heat treatment following cutting, errors are introduced which did not exist in the "green" gear.

In order to restore hardened gears to their original accuracy, various methods have been employed, such as grinding and lapping the tooth form. Where considerable distortion takes place in hardening and quiet operation is essential, grinding presents a practical but rather costly solution to the problem. Where, however, it is possible to harden gears and hold the inaccuracies, such as tooth shape and spacing, to within 0.002-inch, it is more economical and satisfactory to finish the gears by lapping.

Different Lapping Methods

There are several different methods in use for accomplishing this operation. The former accepted method was to run the gears together in pairs, introducing an abrasive compound between the teeth. This operation removes the roughened tooth surfaces to some extent, but does not correct distortions, and if carried too far, destroys the tooth shape.

It is evident why this should happen. If we consider that the only place where the lapping is accomplished is where the teeth slip upon each other, then the teeth would be lapped at all other points than in the vicinity of the pitch line. The greatest amount of lapping, of course, is done where the greatest slippage takes place. Obviously, unless this operation is carefully conducted, satisfactory results are difficult to obtain.

Another method recently introduced, in which the rotative motion has relatively little to do with actual lapping (except in changing the bearing length and location), but where the lapping is done by a reciprocating motion, slight errors are corrected without destroying the tooth shape. This lapping process, of course, has the additional advantage that it produces smooth working surfaces on the teeth, resulting in a reduction in friction and vibration, and hence assuring quieter operation.

The method best suited to checking gears is to a large extent governed by requirements. These can be

Fig. 2—Method for checking involute tooth shapes by comparing with a master involute cam

divided into two distinct classifications:

1. Checking an original design to determine whether or not specifications have been adhered to, which would comprise principally a check on the individual tooth elements.

2. Checking gears when produced in quantities, where manufacturing tolerances must be adhered to and errors are considered in combination rather than separately.

Obviously, if only one gear of a kind is to be made, it would be treated in the same manner as an original design and separate checks would be made on the various elements. If, however, the gear was to be produced in quantities, then devices capable of determining accumulative errors would be employed.

Devices which fulfill requirements to be met under the first classification include gear tooth calipers, templets, pin gages and the like. In the second classification are testing fixtures employing needle indicator or dial gages, master gears in combination with recording devices and others.

From the standpoint of inspection, the four most important elements are tooth shape, tooth spacing, tooth thickness and concentricity. Helical gears introduce a fifth element, helix angle.

Checking Tooth Shape

Most gears in use are of involute tooth shape and checking the involute is a comparatively simple operation. The involute is that curve traced by a point in a string as it is unwound from a cylinder known as the base circle. Any apparatus employing this fundamental principle naturally will assure the most accurate and reliable means for checking tooth shape. A device employing this fundamental principle is shown in Fig. 1. This is known as an involute testing machine. It operates as follows: Two straight edges are attached to a pedestal and are located in the same plane. Two cylinders, of the same diameter as the base cylinder from which the involute is generated, roll on these straight edges. These cylinders are held on an arbor and a head is provided to facilitate rolling as shown in Fig. 1.

In the central plane, and at the point of origin of the involute is lo-

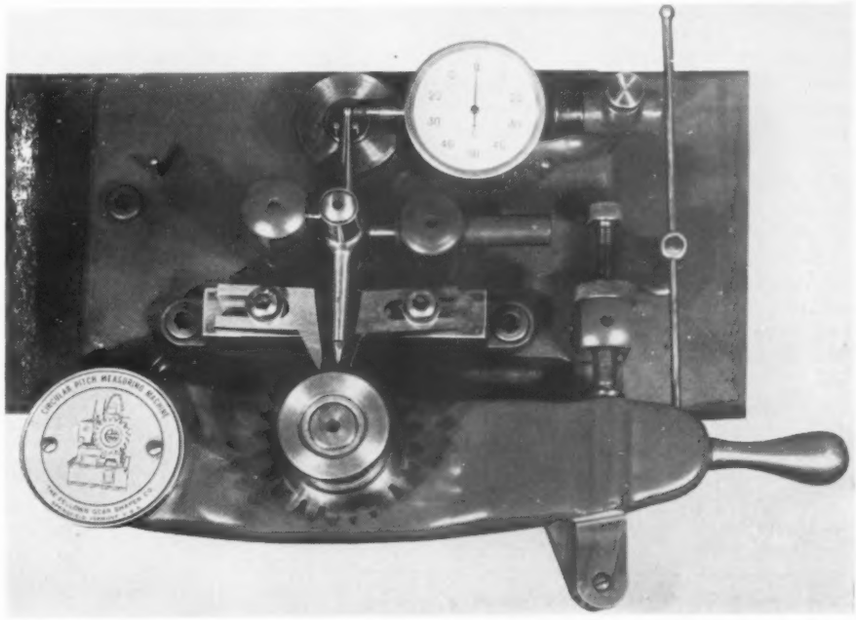


Fig. 3—Device for checking circular pitch or tooth spacing

FIG. 4. — Checking circular pitch on a gear measuring machine, the same principle being involved as in the device shown in Fig. 3

cated a contact pointer to trace the curve on the gear tooth. This pointer, through suitable arrangements, operates a dial indicator without multiplication, the multiplication being in the indicator itself. It is obvious that as the base cylinders roll along the straight edges without slippage, any movement of the indicator needle indicates a deviation from the true involute. This is a basic principle and is employed where extreme accuracy is desired in the checking of tooth shapes.

Master Involute Cam Used

Another method is shown in Fig. 2. While the principle used here is fundamental, it is applied in a slightly different manner. A master involute cam, rather than base cylinders, is employed and the testing fixture is controlled by the master involute cam and guide bars. As the testing fixture is moved about on the table with the involute master in intimate contact with the guide bars, any variation in the involute being checked from that of the master is reflected in a movement of the indicator needle. This gear measuring machine is particularly adaptable to checking gears and is easy to operate.

Tooth spacing or circular pitch can be checked readily on a fixture generally termed a circular pitch testing fixture shown in Fig. 3. This device has a fixed stop against which the gear tooth is brought to bear, and a movable pointer connected with a dial indicator which contacts the adjacent side of the following tooth. The gear is held on a stud carried in a fulcrumed arm. One side of the tooth is brought in contact with a fixed stop, being held against this stop by a spring block. The contact pointer carried in a lever is brought in contact with the adjacent side of the following tooth. Any errors in tooth spacing are registered on the dial indicator. All the teeth of the gear are checked by withdrawing the fulcrumed arm and indexing the gear on the stud.

This same principle is applied on a gear measuring machine, Fig. 4. The fixture is fulcrumed to the table to which a stop is also clamped. The fixture carries a contact pointer, stop and spring finger that fulfill the same function as similar members on the fixture previously shown.

The circular pitch checking devices previously shown are applicable to external gears only. Fig. 5 shows a fixture for checking circular pitch of internal gears. The same principle for mounting the contact pointer is employed, and the entire apparatus is attached to a swinging arm, which can be elevated to remove and replace the work. The position of this arm can be set definitely to check gears of various diameters, within a certain range, by means of an adjustable stop located at the rear of the bracket.

Tooth thickness, backlash, and center distance all bear a direct relation to each other. Where two gears having the same number of teeth are to operate together, backlash is generally provided for by thinning the teeth of both gears an equal amount. Where one gear is much smaller than the other, it is the practice to leave the teeth of the pinion standard thickness and provide for backlash by thinning the teeth on the gear. This would be the recommended practice where both were made from the same material, as it would tend more nearly to balance the strength of the teeth in gear and pinion.

Measuring Backlash

There are two methods of measuring backlash, one by the use of a feeler gage placed between the teeth when they are located at the required center distance; and the other by bringing the teeth into intimate contact and then determining the difference between the standard and measured center distance. This last check does not indicate backlash directly, but it can be determined by the following formula:

$B = 2 \text{ Tan. } VP \times d$

In which: B = Backlash in inches
VP = Pressure angle
d = Difference between standard and measured center distance.

Eccentricity of the pitch circle can be checked by a device known as a cone point testing fixture, Fig 6. The gear to be checked is held on a fixed stud and is free to rotate on the latter. The stud is retained in a fulcrumed arm. The cone pointer is

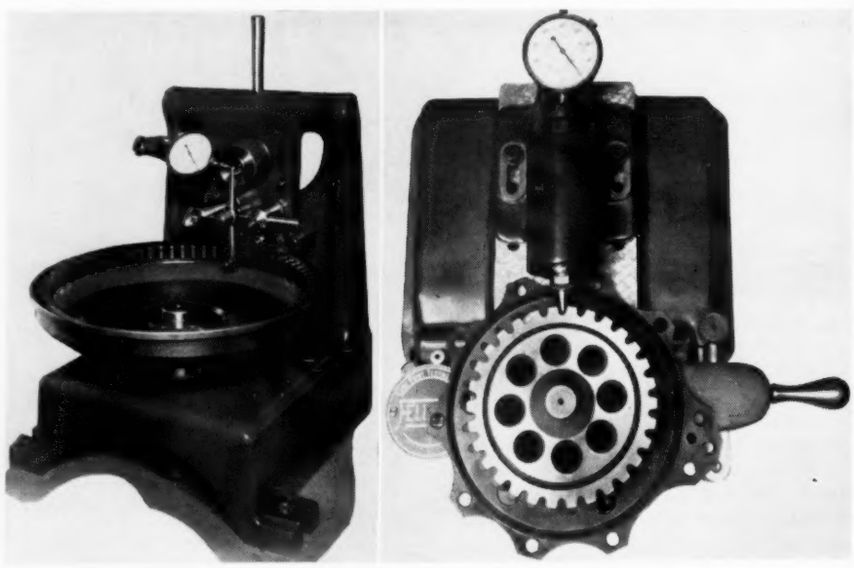


Fig. 5 (left)—Fixture for checking circular pitch of internal gears. Fig. 6 (right) —Fixture for checking concentricity of pitch circle

held in a spring actuated plunger, this plunger contacting the plunger of the dial indicator. The cone pointer is located in the tooth spaces and any errors in concentricity are reflected directly on the indicator.

In checking helical gears, an element not present in spur gears is introduced. The teeth are not parallel with the axis, but are located in an angular relation to it. In order to obtain the best results from helical gears which operate on parallel axes, it is imperative that tooth contract between mating gears extend across the face width of the gears, necessitating that the helix angle of mating gears be held within close limits.

Check Separate Elements

The devices just described are intended primarily for checking individual elements of gear teeth, independent of other elements. Such devices are especially useful for checking original designs, or when during various stages of manufacture, a check on individual elements is desired.

A close study of the action of gear teeth always will reveal more than one tooth affecting the operation of a mating pair of gears, so that a careful check of the individual elements does not present a complete picture. An individual tooth element check does not indicate what effect a certain error in one tooth will have on another tooth.

A combined inspection of all errors in combination more nearly meets the demands of manufacturing requirements, because it more closely approaches the actual conditions obtained when the gears are in operation. Fig. 7 shows an inspection machine known as the "Red Liner," deriving its name from the red line chart of gear inaccuracies which it produces. Its operation is based on the principle that errors in gears affect their center distance relation when the gears are brought into intimate contact and rotated. One gear (generally a master of known accuracy) is held on the driving spindle, the latter being retained in a fulcrumed bracket. The gear to be tested is held on a fixed stud, or fixture, depending upon its design.

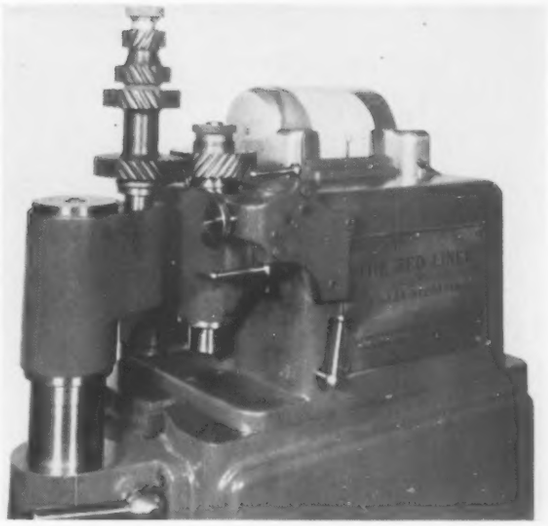


FIG. 7 — Closeup view showing master gear in contact with gear being tested on machine which automatically charts all errors in the gear in combination. Typical charts are shown in Figs. 8 and 9

Errors in the gear being tested impart a movement to the fulcrumed bracket; this in turn, through a multiplying lever arrangement, operates a pen, which is in contact with a constantly moving paper chart. This device charts all errors in combination and makes a permanent record. It is possible to analyze the charts so produced, and to detect and determine the magnitude and location of various inaccuracies. The multiplication is 200 to 1, so that an error of 0.001-inch in the gear is 0.200-inch on the chart.

This inspection machine reproduces the inaccuracies in the work, and when the gear to be inspected is checked against a master of known accuracy the result is a composite of all of the errors in the inspected gear. The errors, however, can be analyzed and their location and magnitude determined.

Consider the case of a spur gear cut without any particular pains taken to obtain extreme accuracy, in other words an average gear. Accumulative error does not exceed 0.001-inch. Tooth surfaces are not extremely smooth and there are slight errors in circular pitch. However, it would prove to be a satisfactory gear if it could be used without being heat treated after cutting.

While many studies have been made in producing steels for making gears, it is still impossible to put a gear in the furnace and have it come out unaltered. Distortion, although

(*Please turn to Page 67*)

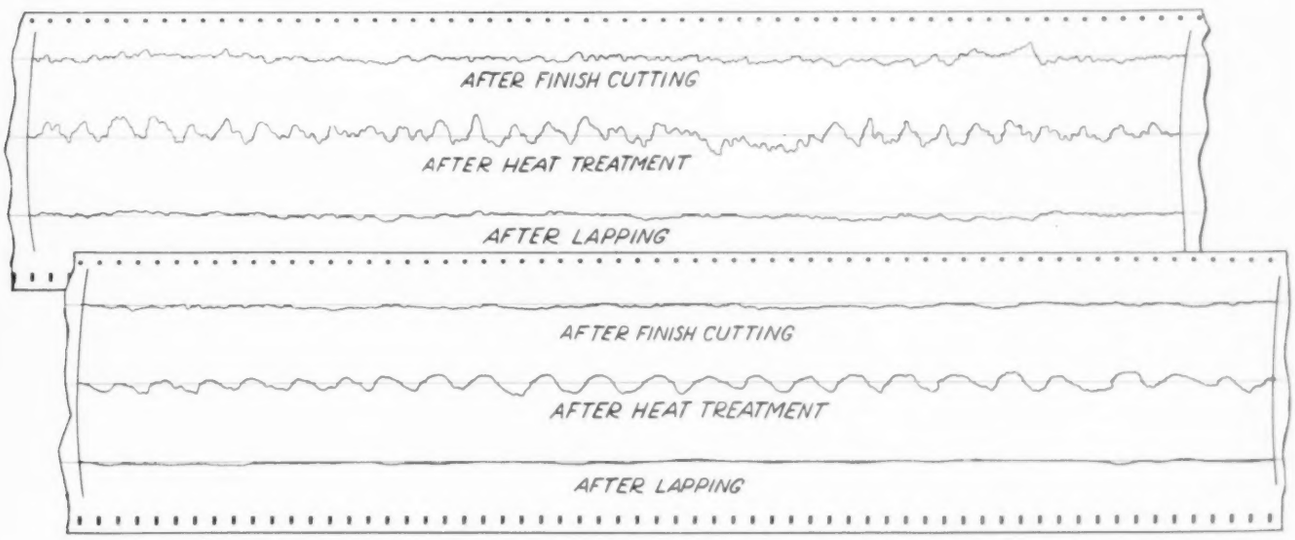


Fig. 8 (top)—Composite chart illustrating condition of a pair of spur gears after finish cutting, heat treatment and lapping. Fig. 9 (bottom)—Similar chart showing condition of a pair of helical gears after finish cutting, heat treatment and lapping. Helical gears, if properly cut and mounted, show a decided improvement in action over spur gears

SIXTEEN cubic yards of hard rock, shale and earth is just a mouthful for this aluminum alloy shovel dipper, used in coal stripping operations in northern Illinois

Aluminum Alloys and Steel Combined in Large Shovel Dipper for Coal Stripping Work

IN THE central part of the United States lie extensive beds of rich, soft coal, many so close to the surface that conventional methods of shaft mining have been replaced by the more economical excavation or stripping of the overburden of clay, rock, gravel and sand. This process, known as open-pit mining, was employed as early as 1887 in Pittsburgh, Kans., but it was attended with indifferent success until 1910, when equipment and methods of operation were changed radically.

Shovels and dippers used until then were of small capacity, and the time consumed in unearthing the veins of coal made open excavation too costly to compete with shaft mining. The shovels used in digging the Panama canal were of a type similar to those used in open-pit mining, of 5-cubic yard size, and considered of exceedingly large capacity at that time.

But such shovels today are considered inadequate and machines of far greater capacity have been built, such as a 20-cubic yard shovel used in coal stripping service.

In typical coal stripping service 12-cubic yard steel dippers have been used. The shovels have a working radius of over 100 feet and they can dump a load more than 70 feet above ground level.

In spite of this tremendous size, each is handled by one man and can make a complete digging cycle in 50 seconds. The cycle consists in filling the dipper, swinging a third of a circle, dumping, and swinging back.

Increase Capacity a Third

In order to reduce the costs of stripping, the Northern Illinois Coal Co., Wilmington, Ill., recently decided to increase the capacity of a dipper by 33 1/3 per cent without increasing operating costs or reducing operating speed. A 16-cubic yard dipper was built of aluminum by the Marion Steam Shovel Co., Marion, O., and tried out in service tests. So successful was the initial performance of this aluminum dipper that another, of 17-cubic yard capacity, was ordered only eight weeks after the first was placed in operation. Four weeks later, a third, also of 17-cubic yard capacity, was ordered.

The body of the first dipper—those of the latter dippers were similar in construction—was made up of two aluminum alloy plates, each ¾-inch thick, 7 feet 8 inches wide and 16 feet long. These plates weighed about 1300 pounds each and were the largest ever produced in this alloy. The body plates were separated at the back by aluminum alloy castings to form a stiff wide box girder. Back connections for dipper stick, pitch braces and door hinges were made in heat treated cast aluminum alloy pads or brackets fastened to the shell plates. Each of these pads weighed about 1100 pounds.

The door plate was of aluminum alloy plate 1¼ inches thick, 7 feet wide and 8 feet 2 inches long. Hinges and cross reinforcing members were of aluminum alloy castings. The bail was made up as a riveted box girder. Cover plates 1¼ inches thick and 16 inches wide were bent to conform to the wishbone shape of the arch. Vertical web plates, 1 inch thick, were sawed to shape. Covers and webs were connected by aluminum alloy angles heat treated after hot forming.

All plate was formed to shape in rolls and presses at 360 degrees Fahr. This temperature had no adverse affects on the physical properties of the metal and made it temporarily much more workable.

Parts of the dipper subject to the heavy abrasion of rock and gravel, such as the cutting lip, the teeth, and the bottom band, were clad with

steel. The cutting lip was a manganese steel casting extending back along the sides to and including the bail pins. The teeth were relatively short and equipped with renewable steel points.

The dipper carries a heaping load considerably in excess of its 16-cubic yard capacity. The wide sides of the bail prevent much material from spilling and thus serve to increase the rated capacity. The smooth outer surface resulting from the use of well rounded plates contributes to the ease of digging.

Complete with teeth, the 16-cubic yard dipper weighs 32,000 pounds, which includes 17,500 pounds of steel parts. The volume of the aluminum parts represents 70 per cent of the dipper, although they weigh less than the steel parts.

Gross weight of the dipper, fully loaded, is 78,000 pounds, slightly less than the gross weight of the average 12-cubic yard steel dipper previously used in the stripping service.

Since the first of the year, Marion Steam Shovel has built a 7-cubic yard and a 10-cubic yard dipper, both of aluminum alloys. The larger of the two will replace an 8-cubic yard steel dipper without increasing cost of operation or retarding speed.

Decreased dirt moving costs mean a direct increase in the value of coal lands. At the present time coal which is more than 50 feet below the surface is seldom mined by open-pit methods as the cost of deeper stripping increases production costs to a prohibitive figure. But if the cost of removing overburden is decreased by 25 per cent because of larger dipper capacity, then the maximum economic depth at which coal can be mined profitably is increased by 25 per cent, or 12½ feet.

Makes Hollow Cable for Current Transmission

Hollow core bare transmission cable, long used abroad, now is manufactured in this country by the General Cable Corp., which recently completed a new factory in Los Angeles. Here is being made the copper cable to be used in transmitting electrical energy 271 miles from Boulder dam on the Colorado river to Los Angeles.

The conductor to be used for this purpose is in effect an economical, flexible, segmental tube which can be made in long lengths. The conductor is a single self-supporting layer. Because of the tightly interlocked segments the conductor maintains a circular cross section and practically is uncrushable. The tongue of each segment, as shown in the accompanying illustration, is engaged by the groove of the following

Cross section of cable showing interlocked segments of special design

segment so that it cannot slip out; they can move lengthwise in the grooves, however, and thus give the required flexibility to the cable.

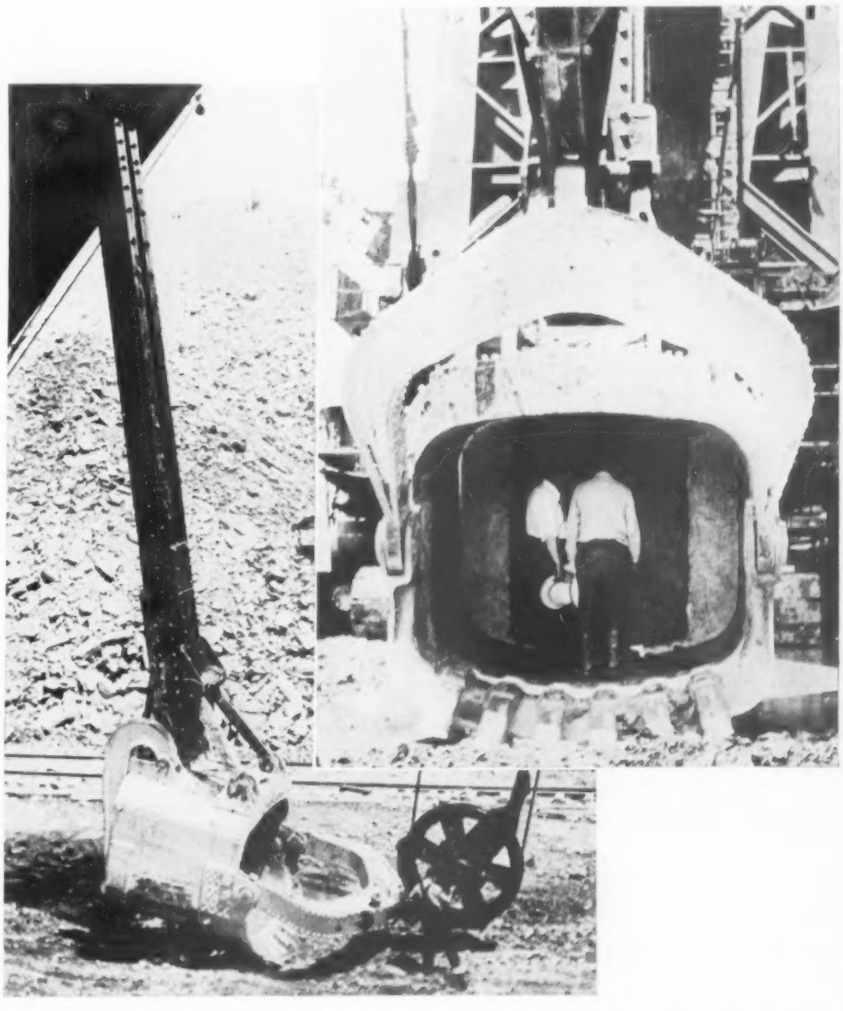
New Hydraulic Matrix Press

Lake Erie Engineering Corp., Buffalo, has developed a new hydraulic matrix press known as the Directomat. It is for use in high speed molding, either hot or cold, of high grade matrices for the printing industry.

Malleable Iron Elongation 6 Instead of 16 Per Cent

In the article, "Improved Properties Extend Uses for Malleable Iron," by D. P. Forbes, president, Gunite Foundries Corp., Rockford, Ill., appearing in the June 24 issue of STEEL, reference was made in the next to last paragraph on page 35 to a material with a "tensile strength of 90,000 pounds per square inch, a yield point of 70,000 pounds and elongation of 16 per cent in 2 inches." The elongation of "16 per cent" was a typographical error; it should have been given as 6 per cent.

Elongation of the material of 70,000 pounds tensile and 50,000 pounds yield point, mentioned in the same paragraph, was correctly reported as 16 per cent.



THE BIG DIPPER! Some idea of the size of the shovel dipper is given by these illustrations; at left, an operator is adjusting the pulley to the bail; at right, two engineers are inspecting the interior of the aluminum alloy dipper

A New Product—How Can It Be Merchandised Profitably?

BY L. S. HAMAKER
Berger Mfg. Co., Canton, O.

Abstract of an address given by Mr. Hamaker at an industrial marketing conference during the convention of the Advertising Federation of America in Chicago, June 11. Widely recognized for his direction of sales promotion at Republic Steel Corp., Mr. Hamaker is now vice president and general manager of Berger Mfg. Co., a Republic subsidiary

GENERALLY speaking, the steel industry as a whole never has been noted for aggressive merchandising of its product. As a matter of fact, the sales philosophy which is a remnant of the days when all steel was much the same, and all engineering design necessarily had to conform to the known limitations of this standard material, still prevails to a considerable extent in the industry today. This sales philosophy can be stated in the phrase, "We make steel; come and get it."

Sales Now Chief Problem

In relatively recent years, however, merchandising has begun to enter the steel industry. This change is partly due to the development and growth of a wide range of tailor-made alloy steels for specific purposes and partly to the fact that steel mill management is no longer composed exclusively of men who have reached their present eminence through a long apprenticeship in the mills—the operation end of the business. No discourtesy to such men is intended by this statement. The point is that efficient production, while still vastly important, is no longer the major consideration in steel. The major problem is sales.

New markets opened up by alloys, stainless steels, high-strength steels and others provide the real merchandising opportunity of the steel industry today. The important thing to know about any new product is not "can I make it?" but "can I sell it at a profit?" There are scores of other questions a manufacturer should ask himself before spending a cent on a new product, yet it is amazing to see the money wasted every year by companies of good standing who permit their enthusiasm to run away with them merely because their plant happens to be well equipped to produce the new product under consideration.

A few of the most obvious questions to be asked are these: What is the potential market for the new product? How much are you justified in spending in development? How much educational work would be required to sell it? What kind of a sales set-up would you need?

The depression has caused nearly all manufacturers to search for new products. Many an executive, intrigued by the novelty of a new device, has jumped into production with sad results.

It is interesting to sketch some of Republic Steel Corp.'s marketing experiences with stainless steel, which has been produced in commercial quantities only during the last seven or eight years. It has literally thousands of uses. The problem was to determine which markets warranted intensive cultivation, and since many of them had never before been considered as important outlets for steel, we had almost a pioneering job on our hands. Some markets, such as the preserving, canning and restaurant industries were so obvious as to require no serious investigation. The dairy machinery industry quickly fell into line when it was demonstrated that stainless was impervious to all dairy products. The oil industry promptly adopted stainless for refinery tubes and other applications because of its resistance to high temperatures, and it began to be used almost voluntarily for building decoration and automotive trim.

None of these involved profound market studies, though a great deal of laboratory work was done on the product itself. In these industries the need for such a product had long been felt and its acceptance was rapid. Real work began when we introduced stainless into industries which did not recognize a need for it. In some cases investigations into these markets resulted in highly specialized advertising campaigns. In others no advertising seemed to be indicated.

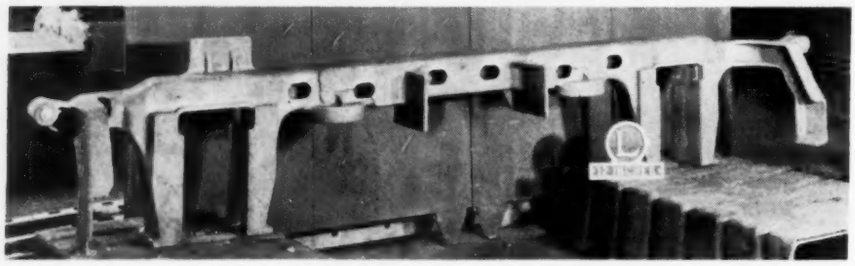
Industries Differ Widely

We have had all sorts of experiences, and some surveys have been more successful than others. We have found peculiarities in some industries which have entirely changed our sales approach, such as in the tobacco industry.

One of the most successful surveys had to do with the textile industry. For several years Republic did no advertising to the textile industry despite the fact that some competitors were running advertising of a general nature. We are firm believers in not advertising until we know what we are talking about. We wanted to know just where our market was in the textile industry, and we wanted something specific to advertise before spending any money. As a result of the survey Republic assigned two metallurgists to a large eastern textile institute for a period of many months, where, under a special arrangement, they were able to avail themselves of an enormous amount of test data. As a result Republic's metallurgical salesmen were equipped to sell the industry on an intelligent, effective basis.

In Chicago a survey was made of

Alloy Castings Combine Physicals with Low Weight



THIS SIDE FRAME FOR BALTIMORE & OHIO'S ABRAHAM LINCOLN PASSENGER TRAINS, as well as all other steel castings for the trucks and bodies of this light-weight equipment, were designed by American Car & Foundry Co., New York, and produced by Lebanon Steel Foundry, Lebanon, Pa., of a manganese-chromium-molybdenum alloy steel known as Circle L No. 2. It was selected as combining the required physical qualities with low weight. Used regularly for valves, fittings, machine tool parts, crankshafts and airplane castings and for parts for the railroad and automotive industries, this alloy, following a special heat treatment, develops high tensile and yield values with satisfactory ductility

the meat packing industry. As a result, once our men knew exactly where stainless should be used and why, where competitive materials had failed in service and where ordinary materials were plenty good enough, they succeeded in increasing stainless sales to the meat-packers 300 per cent the first year.

In connection with these surveys, it is apparent that the array of facts necessary to arrive at a decision on any particular market are all in existence somewhere if you only know where to find them. If we can't determine the real facts through any means available within our own organization, we make an outside investigation of it. After a good many years of trying to compile market data through our own sales force we have given up the idea as impractical. All our own salesmen are employed and trained to sell. They have little time for field study of potential markets, buying trends and other factors affecting future developments in a specific industry. Even if they had time and inclination to make these studies they are handicapped and in fact disqualified for the very reason that they are salesmen and not impartial investigators.

Outsiders Do Better Job

We have come, through experience, to recognize that the study of market potentials, competitive conditions, changes in buying practices and similar trends can best be done by a competent outside organization. The swivel-chair type of survey is about 90 per cent desk work and 10 per cent field work. A competent market research organization almost exactly reverses this percentage and is able, through its status as an unbiased investigating agency, to obtain information and to interview people not available to manufacturers' direct representatives. The cost of such surveys is not great. I do not believe we have had any single one that cost more than $1500, which is less than an aimless advertising campaign would cost in a few months. After you have the facts is the time to advertise, not before.

There is one word of warning to be issued, however: After you have a good survey, what are you going to do with it? Many thousands of dollars have been wasted in field surveys and market investigations because the man for whom the survey was made failed to do anything with the report. The real job starts when the market report is delivered. The follow-through is 90 per cent of the job. A good market survey is like a railroad ticket. It will take you places only when you use it.

I think every advertising manager should make the necessary arrangements to be in on all new product considerations from the very start. It is his own fault if his position in the company is such that he does not learn of new products until the company has definitely adopted them and turned the advertising job over to him. The most valuable service he can render, in my opinion, is to sell his management on the necessity for proper market studies in connection with new products under consideration. Once the course is properly charted the advertising procedure usually represents no difficulties.

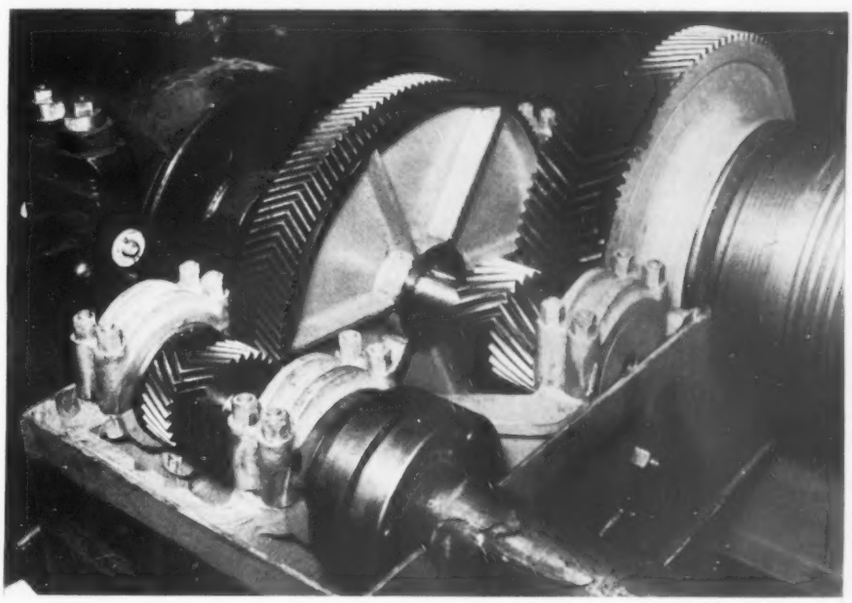
New steel clutch plate of flexible center type has exceptionally few moving parts

Full Floating Hub Clutch Plate for Motor Cars

A new full floating hub clutch plate for passenger cars and trucks has been introduced by the Es-M-Co Auto Products Corp., 33 Thirty-fourth street, Brooklyn, N. Y., and is being marketed under the trade name Aero-Flex. For a so-called flexible center or damper type it has exceptionally few moving parts. It has but four springs of special design surrounding the full floating hub and is stated to be vibrationless at all speeds. It is said automatically to adjust itself to misalignments between motor and transmission.

Design and construction is shown in the accompanying illustration of the clutch plate with a section of the housing removed. The hub blank is drop forged of S. A. E. 1035 steel and faced, bored, broached and turned within close tolerances so as to insure correct fit. The clutch disk is made of steel of the usual clutch plate grade. Laminations are blanked out of high carbon, hot rolled steel. The four springs are cut and formed from silicomanganese steel wire. End plates at first were made of bright cold rolled steel and finished by copper plating. The company now finds it less expensive to buy copper plated sheets direct from the mill and finds the plate thus obtained to be superior to the former type.

Cranes Are Highly Developed



MODERN CRANES REFLECT IMPROVED DESIGN: This illustration shows the main hoisting gear train of a 40-ton trolley. It illustrates welded gear construction with herringbone teeth, an outstanding development which reduces cost of operation and maintenance and makes for quietness. The cast steel frame on which all the gears are mounted is in one piece and this assembly is completely enclosed in an oiltight, welded steel housing. The crane truck ends and the trolley frame, not shown, are of welded steel construction. Roller bearings are used throughout, reducing power consumption and increasing smoothness of operation. The crane also is completely equipped with a one-shot, automatic, lubricating system. Other features include great flexibility of control equipment, multiple-disk type mechanical brake with oil-cooled plates, steel footwalk with toeboards extending the full length of the bridge, speed reducer bridge drive at center of span, one-piece tapered steel wheels to prevent flanging, complete accessibility of all working parts. Photo supplied through courtesy of Whiting Corp., Harvey, Ill.

Spectrograph Gages Purity Of Nonferrous Ingots

IN ORDER definitely to raise standards of purity and accuracy of analyses of its nonferrous ingots, the Michigan Smelting & Refining Co., Detroit, subsidiary of Bohn Aluminum & Brass Corp., in many instances is supplanting chemical methods of analysis by the spectrograph. This marks a radical departure in the use of this instrument which hitherto has been found mainly in scientific laboratories where the ultimate in precision measurement is required.

For those not acquainted with this instrument, the spectrograph is a photographic means of analyzing a substance for the elements of which it is composed. Both qualitative and quantitative analysis may be accomplished rapidly by its use. It is particularly suitable for quantitative analysis of those elements present in small percentages, and for this purpose is found to be most accurate.

The essential parts of a spectrograph are a slit, prism, collimating lens for focusing parallel light on the prism, and a camera lens for focusing the light emerging from the prism on the photographic plate. The prism has the power to resolve or break up the light passing through it into its various wave lengths, which make up its characteristic spectrum. Every element, either when burned in a flame or volatilized in an electric arc or spark, emits light which, when passed through a prism, is broken up to form its characteristic spectrum, by which that element may be identified definitely.

When a material, for example an alloy consisting of copper, zinc and tin, is burned in an arc, a composite spectrum is formed, in which the spectrum of each of the separate elements will be found.

Since the majority of the sensitive spectral lines lies in the ultraviolet or "invisible" portion of the spectrum, it is necessary to use an instrument having quartz optical parts, because ordinary glass does not transmit ultraviolet light. Fortunately, though not visible to the eye, the ultraviolet portion of the spectrum can be photographed, in the same manner as "visible" light. The observations in this "invisible" region are, therefore, made by photography, and the photographic record, called a spectrogram, is then examined for the results. The photographic plate thus serves as a permanent record of the analysis.

The principle of quantitative analysis by the spectrograph is based upon the fact that, the higher the per cent of the element present, the more intense are the sensitive spectral lines of that element. This is clearly seen in plate I, which shows the spectra of cadmium having increasing percentages of lead. It will be noted the lead line having a wave length of 2614.20 angstrom units gradually increases in intensity as the per cent of lead increases. This spectrogram and those that follow were taken on a Bausch & Lomb medium quartz type of spectrograph.

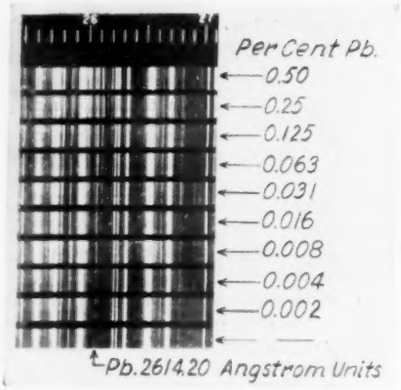


Plate 1—Spectra of cadmium with lead content increasing from 0.00 to 0.50 per cent

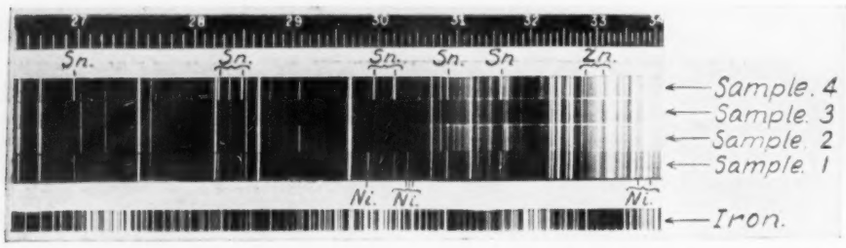


Plate 2—Examination of four samples of cadmium-base bearing alloys for tin

Plate 2 is a spectrogram illustrating an examination of cadmium-base bearing alloys for presence of tin. It will be noted samples 2 and 3 are absolutely free from tin, while sample 1 and 4 are too high in tin content and could not be used. In addition, a study of the spectra shows that sample 4 is contaminated with nickel and zinc, and sample 1 with nickel. Such an examination serves as a rapid check on the presence of undesirable elements.

Shows Manganese Content

Not only in the field of the manufacture of bearings has the spectrograph proved its value but also in the production of other alloys. To cite merely one example: The manganese content of German silver extrusion billets is maintained between the limits 0.10-0.20 per cent, and plate 3 represents a typical control analysis obtained, as a check on the quantity of this element present. The lower set of four spectra are standards having 0.03, 0.10, 0.15 and 0.25 per cent manganese. The upper eight spectra are samples 1, 2, 3, 4 in duplicate. It is clearly evident from a comparison of the intensities of the sensitive spectral lines of manganese in the samples with those of the standards, that sample 2 is the only one which appears to be outside the required specifications.

Although it is only recently the vital importance of spectrographic analysis in industry has been realized, the Bohn corporation has made limited use of this method of control for some time.

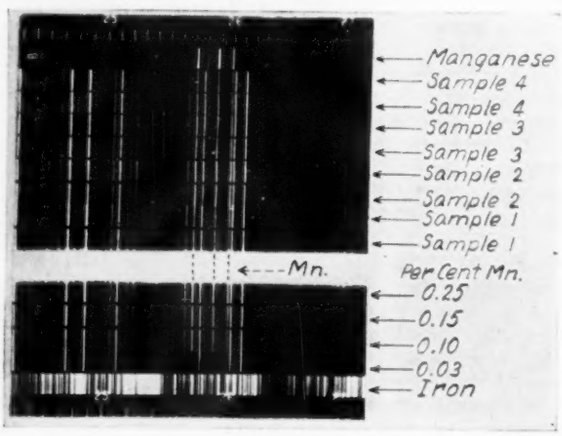


PLATE 3 — Typical control analysis of German silver extrusion billets for manganese content

METHODS AND MATERIALS

Cellulose Wrapping Causes Staining of Steel Parts

To produce a more attractive, salable package, some manufacturers of small tools and machined parts have discontinued the use of wax paper and have adopted some of the transparent, regenerative cellulose film sold under a variety of trade names. These manufacturers have received numerous complaints to the effect that parts so packed were etched, stained or corroded, and could not be sold without further polishing.

A majority of these manufacturers had used one of the various varieties of a standard rust preventative, therefore, the maker of the rust preventative made an investigation of one of the complaints. The test was conducted by coating six polished steel strips with one of the rust preventatives and placing between two of the strips a piece of wax paper, between another pair a piece of glassine paper, and between the third pair a sheet of the cellulose film which is so extensively used in modern packaging.

Weights were placed on these strips and they were allowed to remain undisturbed for 30 days, after which time the strips were examined. The waxed paper and the glassine paper produced no corrosion or tarnish while the transparent sheets made from cellulose produced a very decided tarnish, indicating the unsuitability of the cellulose for wrapping metallic articles such as small tools, and the like.

The stain or tarnish was found to be due to the cellulose film coming in contact with the metal, for where two pieces of the same metal or dissimilar metal after being treated with the rust preventative came in contact with each other, there was no stain, rust or corrosion. However, where the metal came in contact with the cellulose film a stain was produced. It is the belief of the investigator that the stain is caused by sulphur and other impurities found in sheets of celllulose.

S S S

Develops New Material for Oil Well Sucker Rods

Hydrogen sulphide in the presence of water causes corrosive embrittlement of carbon steel sucker rods in oil wells, and this action contributes to their failure from fatigue. To meet this problem, the Oil Well Supply Co., Dallas, Tex., is manufacturing a new sucker rod made from grade S metal, a low metalloid steel, or ingot iron. This material is described as practically pure clean iron, with slag inclusions eliminated, alloyed with nickel and molybdenum.

The rods are upset by a special process, after which they are fully heat treated; that is, normalized, quenched and drawn over their entire length in the company's heat treating furnace and auxiliary equipment. In this way, it is said, the desired balance between strength and ductility is attained, with the required resistance to sulphide embrittlement and corrosion fatigue.

The company's engineers and metallurgists recommend these sucker rods for sulphide wells in installations where the rod stresses are as high as 30,000 pounds per square inch. According to the *Oil and Gas Journal*, the performance of the nickel alloy iron rods has proved their value is several of the highly corrosive fields.

S S S

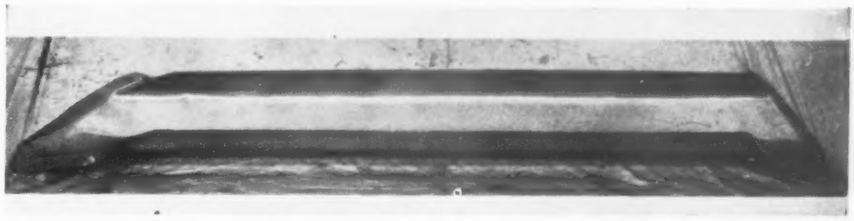
Recommends Roller Bearings For Mine Locomotive Motor

In a new design for mine locomotive motors developed by Norma-Hoffmann Bearings Corp., Stamford, Conn., roller bearings of the floating type, instead of the usual ball bearings, are specified for the pinion or drive ends of such motors.

In this design, a deep groove, single row, ball bearing is used at the commutator end in order to locate the armature endwise and absorb the thrust. This bearing is fitted with a sturdy bronze, land-riding retainer designed to resist vibration and wear.

The use of a roller bearing of the floating type with outer ring rigidly mounted in the frame head is specified for the pinion end in order to allow for expansion and contraction in the length of the shaft under operating conditions. The roller bear-

Longitudinal Steel Hood for Hopper Cars



THIS LONGITUDINAL HOOD FOR STEEL HOPPER CARS is cold formed in one operation by the Parish Pressed Steel Co., Reading, Pa. It is blanked out of ¼-inch steel plate in a large power press, after which the rivet holes are punched in a press of the same type. The cold forming operation is performed in a 4000-ton hydraulic press. Weight of the hood is 205 pounds

ing, with its greater capacity to resist overloads and shocks, and with its ability to adjust itself to slight changes in the length of the shaft, says the company, provides much longer life.

The new design is revealed in detail in a new 20-page booklet on mine locomotive motor bearings. This contains complete information as to how the new design may be applied to the various makes of such motors.

S S S

Much Stainless Steel Used In New Liner Normandie

Over 100 tons of chromium-nickel stainless steel of the well-known 18-8 type were employed for decorative fittings, hardware and furnishings for the French Line's new liner NORMANDIE, which recently completed its maiden voyage from Le Havre to New York and return.

According to the June issue of *Nickel Steel News*, published by the International Nickel Co. Inc., New York, the stainless steel items included all types of hardware, bath fixtures, moldings, base boards, lighting fixtures, beds, modern furniture, metalware, name plates, railings and allied items. The name on the bow is in stainless steel letters over 3 feet high.

The stainless steel window frames for the winter garden of the NORMANDIE were fabricated by the Edward G. Budd Mfg. Co. Philadelphia. The winter garden is located on the forward deck of the liner, hence the window frames had to be built to withstand the attacks of heavy winter seas and at the same time had to be light enough not to interfere with visibility. The stainless steel fabricated by the Budd shot-welding process met these requirements. The garden extends entirely across the ship, 116 feet long, 108 feet deep and 22 feet high. Both sides and front are glass enclosed.

S S S

Boron Carbide Extrusion Dies Resistant to Wear

Pressure blast nozzles of boron carbide are giving good results in service. They are guaranteed to have a minimum service life of 750 hours when used with silica sand and of 1500 hours when used with steel grit or shot, and that during this time enlargement at the outlet end will not increase the size to more than one and one half times the original orifice diameter. A decreased air consumption of 10 to 20 per cent is claimed to accompany their use, and also that they maintain a stream contour and abrasive velocity that improves blasting efficiency.

S S S

Equipment Operates Longer With Hard Surfaced Parts

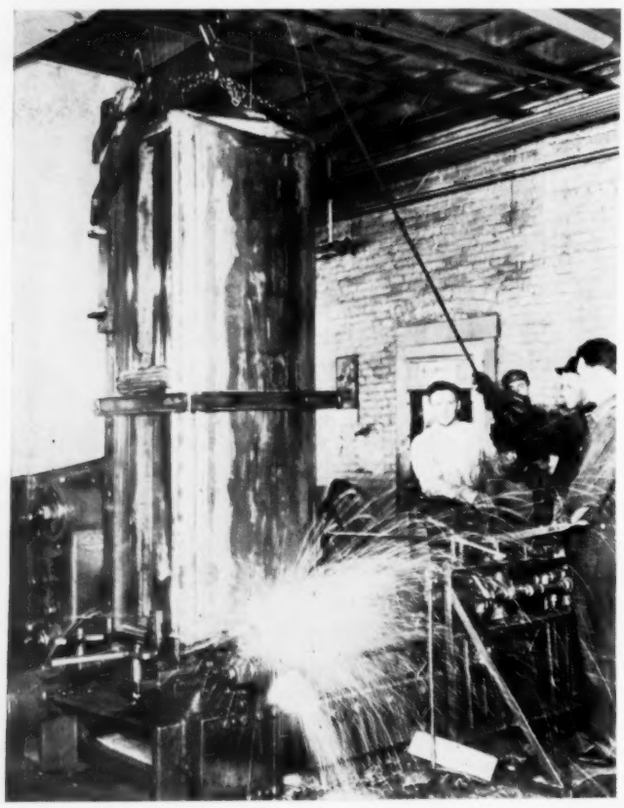
A southern car wheel foundry reports good results in four instances where stellite has been applied for hard facing. Wearing shoes on molds formerly were replaced every 60 days but now they last a year. Teeth on pit tongs formerly were dressed by the blacksmith every 90 days, whereas, the present teeth last a year, and then are reground and returned to service. Wheel cleaners formerly lasted 90 days, but hard surfacing increased their life to one year. Sand plows formerly were replaced every 60 days, but the rebuilt plows lasted a year.

Automatic Flash Welder Joins 30-Inch Seams on Steel Grave Vault

A SPECIAL flash welder, shown in the accompanying illustration, has been designed and built by the Thomson-Gibb Electric Welding Co., Lynn, Mass., for a manufacturer of steel burial vaults. It joins a 30-inch seam on either end of the heavy case.

The vault is formed from a single sheet of metal by a hydraulic press. The ends are folded inward, leaving a seam along the end of the crown and another running from the crown through the center of each end to the bottom of the case. It is the latter seam which is flash welded.

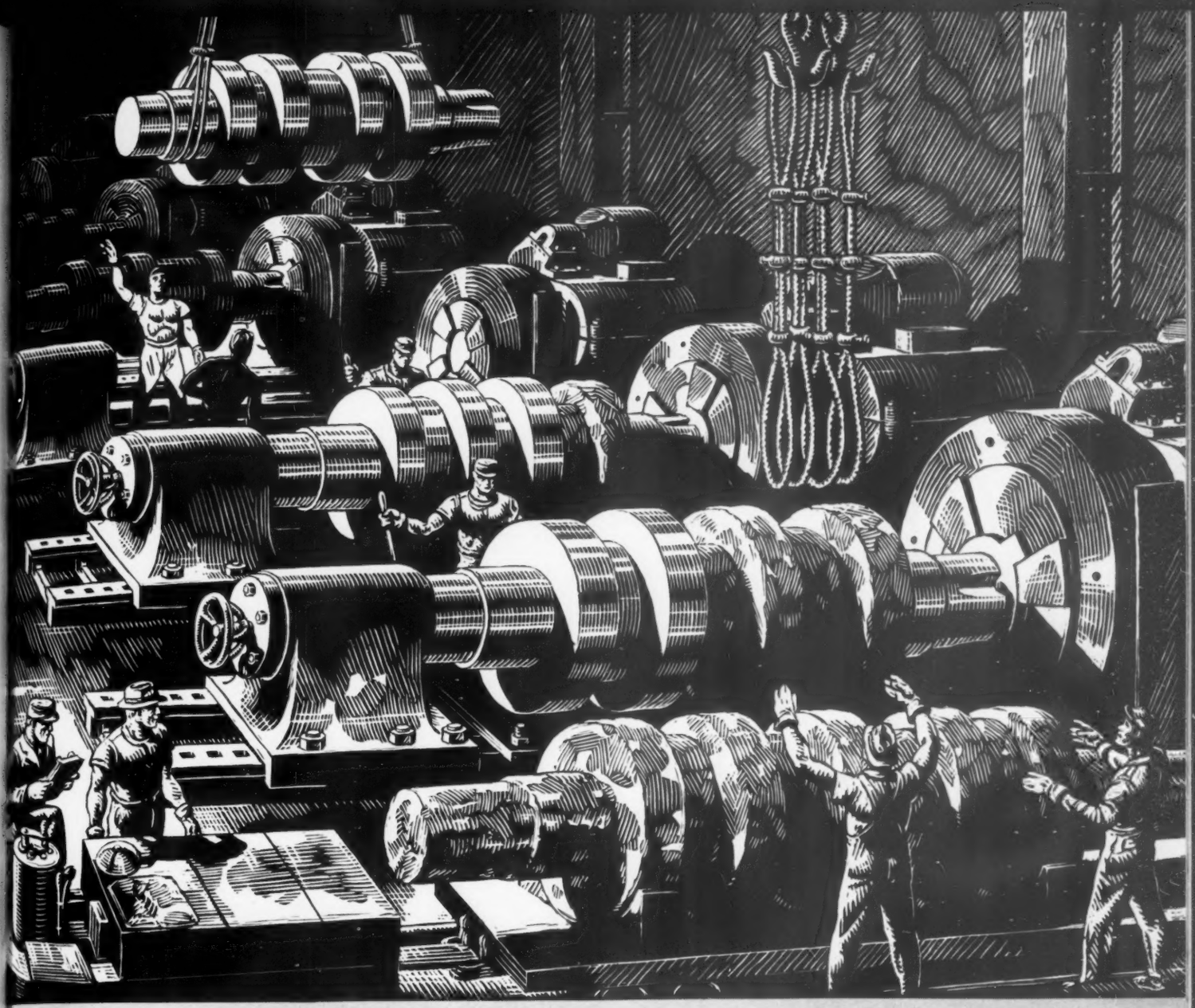
During the operation, the case stands on end with the edges of the seam locked between the welding dies by two powerful hydraulic clamps which exert a pressure of 187,000 pounds. The clamps are individually controlled by hand valves to permit the operator to inspect and control the alignment of each side.



In this flash welder, edges of seams are locked between welding dies by hydraulic clamps which exert pressure of 187,000 pounds

Weld Made Automatically

Once the case is locked in position, the welding operation is started by turning a single switch and is completed automatically with the welding time, current and pressure synchronized and controlled by the machine. The switch starts a 7½ H.P. motor and turns on the welding current. The flashing starts very slowly and is accelerated at the proper rate by means of cams designed to allow just enough time for the edges of the seam to reach the proper temperature before the cams contact the push-up block. As soon as the weld is forged, the cam shaft stops. The clamps are released and the vault is turned end for end and the same process repeated. Finally, the seams along the end of the crown are torch



MODERN ROLL TECHNIQUE

Attention to minute detail governed by years of experience in roll manufacture, has given the products of Pittsburgh Rolls Corporation an enviable position in the steel industry. The standards of roll performance set up by the Pittsburgh Rolls Corporation are regarded by many as standards for the industry.

PHOENIX ROLLS

PHOENIX STEEL, for unusual strength; PHOENIX "A" (steel alloy), for strength and wear; PHOENIX METAL—PHOENIX "K", for strength, wear and finish; PHOENIXLOY (uniformly hard), for flat rolling where high finish of extremely thin gauge of material is required to be free from all marks or defects. Also tube mill rolls of quality material best suited to the kind of service required; PHOENIX CHILL; PHOENIX NICKEL CHILL, for all flat rolling requiring finish.

PITTSBURGH ROLLS CORPORATION

PITTSBURGH, PA.

welded and the case is ready for finishing.

To make sure of a parallel movement of the moving platen, there are two cams on the same shaft and the platen travels in rectangular slide rails at the front and a round alignment rail at the rear. The bearings for these parts are located well away from the line of the flash and dirt thrown off during the welding operation.

The machine is powered by a 400 kilovolt-ampere water cooled, multi-finger pancake coil type transformer which supplies thousands of amperes to the point of weld. The welding dies, which are shaped to conform exactly with the curves and angles of the vault, are also water cooled for long life.

To Build Larger Electric Galvanizing Pots

General Electric Co., Schenectady, N. Y., is preparing to build in larger sizes the electric galvanizing pots it recently placed on the market. Three of these are now being used in this country for the galvanizing of steel wire in continuous strand, while two other units are in similar use in Canada.

This unit consists of two steel tanks, the inner tank being the zinc pot. The space between is filled with lead which serves as the heat exchange medium. The lead is heated by electric immersion heating units, temperature being maintained uniform by a pyrometric control. Heat loss from the tank walls is comparatively small, the firing is clean and the tank life is said to be long.

Ceramic Bodies Approve New Enamel Handbook

Enamels, by Andrew I. Andrews; cloth, 410 pages, 6 x 9 inches; published by Twin City Printing Co., Champaign, Ill.; supplied by STEEL, Cleveland, for $5.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

With the sponsorship of the American Ceramic society and the Porcelain Enamel institute this book comes with authority. This is in addition to that furnished by the author, who is professor of ceramic engineering at the University of Illinois, a fellow of the American Ceramic society and of the American Institute of Chemical engineers.

In the 12 chapters is presented a practical and thorough discussion of all the processes from raw materials to properties and tests. Data difficult to obtain are presented in 62 tables and 124 diagrams graphically illustrate detailed processes of enameling.

Treatment of the various subjects is painstaking and thorough, with a view to presenting answers to all the problems that come up in the plant or laboratory. It is in effect a reference manual presenting the latest in theory and practice.

Improved Leather Belting Has Less Stretch and Delivers Full Load

BY J. J. SLEIN
Graton & Knight Co.,
Worcester, Mass.

RESEARCH leather belting, named because its development was the result of an extensive research undertaking in our laboratories, first was placed on the market in 1931. Since that time, much data on service, life and efficiency of this new belting have been accumulated.

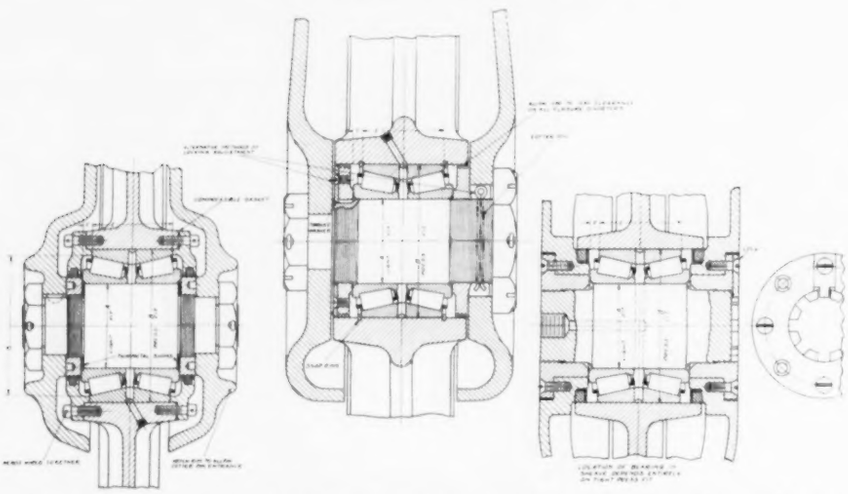
They show that the use of the new belting is attended, on the average, by a reduction in belting service costs of from 25 to 50 per cent. They have 75 per cent less stretch than the old belting, with correspondingly increased friction and transmission value. In more than 50 per cent of the cases studied, the new belts do not develop any stretch at all, even in the first week of installation.

The new belts deliver full load at normal tension. In recent dynamometer tests, they delivered 132 to 136 volts under full load as compared with 42 to 64 volts for belts of ordinary oak tannage. At 50 per cent overload the new belts delivered 96 to 98 volts under the same conditions while ordinary belting averaged 50.3 volts.

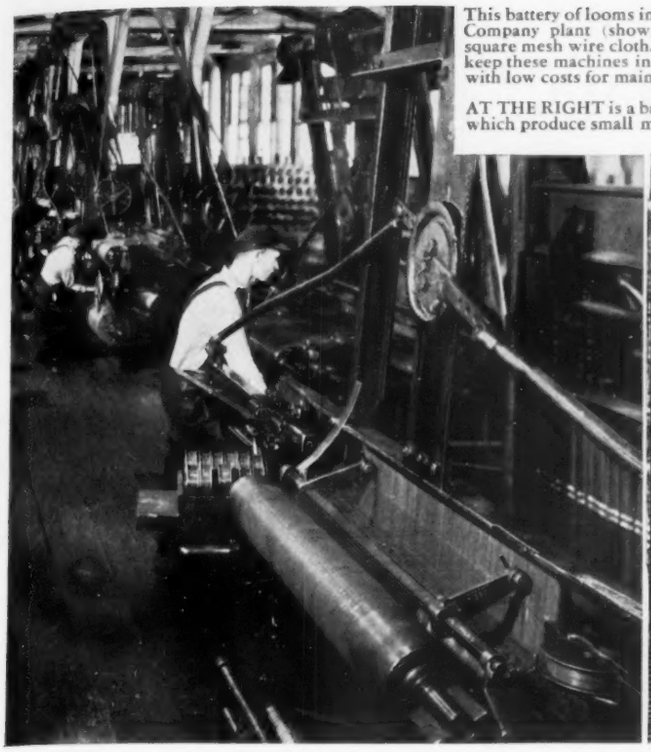
On a "torture" machine, so-called because it produces in 48 hours the effects of six years' service, the new belting lasts approximately 100 hours. Until the advent of the new product, a belt that lasted 14 hours on this machine was considered good.

The new belting in either oak or special tannage is made by a new, exclusive Graton & Knight process, one important feature of which is to position the fibres in the direction of the pull. In addition, the new belting is fabricated by a new tension cementing process in which the cement is fed as a continuous ribbon or film between two plies of leather which are under

New Bearing Mounting



SIMPLIFIES SHEAVE BEARING INSTALLATION: To simplify machining problems developed by the increasing use of manganese steel in crane and hoist sheaves, and to insure accuracy of mounting with its attendant long life and ease of operation, the Timken Roller Bearing Co., Canton, O., has developed a new type of bearing mounting using Timken double cup bearings. This new type of mounting permits the sheave hub to be bored straight through at a single setting. In the design shown at the left, the bearing cup is pressed into the hub and located by means of end caps. Shim adjustment is provided. The central layout shows the cup located by means of snap rings, and in the right hand layout the location of the cup depends upon its press fit in the hub. These basic designs can of course be modified to combine the desired bearing mounting with the type of side frame construction used



This battery of looms in the George F. Wright Company plant (shown at the left) weaves square mesh wire cloth. Gulf lubricants help keep these machines in continuous operation with low costs for maintenance.

AT THE RIGHT is a battery of smaller looms which produce small mesh wire cloth.

GULF LUBRICANTS HELP KEEP PRODUCTION

On Schedule

ABOVE is a battery of special automatic machines which weave chicken wire. The right Gulf lubricants keep maintenance costs down for this equipment.

G.F.Wright Steel & Wire Co.,Worcester,Mass.,Makes 5000 Miles of Wire Fence Per Year . . . with Low Costs for Maintenance

HERE is another leading plant which has standardized on Gulf quality lubricants to keep their modern machinery operating at top notch efficiency.

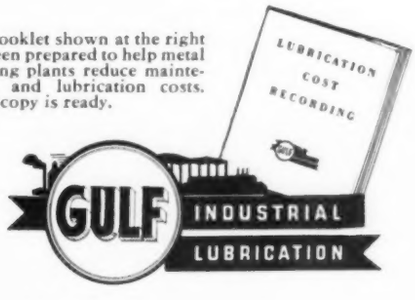
Leading steel and metal working plants report worth while economies from the use of Gulf oils and greases. Fewer stops for adjustments and repairs, less need for overhauling and lower maintenance costs invariably result from improved lubrication practice. And, more important, production is kept *on schedule* when the right Gulf lubricants protect automatic machines from friction and wear.

If you are not using Gulf products in your plant, give them a trial. They will give you the lowest *ultimate* cost for lubrication.

GULF REFINING COMPANY, PITTSBURGH, PA.

District Sales Offices: Boston · New York · Philadelphia · Atlanta · New Orleans Houston · Pittsburgh · Louisville · Toledo

The booklet shown at the right has been prepared to help metal working plants reduce maintenance and lubrication costs. Your copy is ready.



GULF REFINING COMPANY, S-7
3800 Gulf Building, Pittsburgh, Pa.

Please send me without obligation, the booklet "Lubrication Cost Recording."

Name.....

Title.....

Company.....

Address.....

tension approximately equal to that at which belting operates under normal load. This combination of a new process of manufacturing belting leather and the tension cementing process produces belting with unusually high transmission qualities and very little stretch. Too, the new belt is waterproof cemented.

The new belting gives exceptional service under difficult conditions. For instance, there has been no stretch and no necessity for take-up with an 18-inch belt connecting a 225-horsepower motor with an air compressor, operating at 600 revolutions per minute, and the idler formerly used has been discarded. This is a particularly difficult application in view of the pulsating character of the drive. In this case, the new belt has paid for itself in two months due to absence of stretch or slippage. In addition, the compressor builds up pressure more rapidly.

In a cupola drive operating in a temperature of about 100 degrees Fahr., the new belt stretched 1½ inches in the first week and then stopped stretching. The drive in this case is by a 17-foot endless belt, 4 inches wide.

On a wire drawing mill lineshaft driven by a 300-horepower motor at 500 revolutions per minute, the drive is by a Research belt 41 feet 8 inches long and 24 inches wide. Immediately after installation, the belt stretched 1.6 inches. During the subsequent 12 months it stretched an additional inch. This is a very unusual performance in such an installation.

On a wire drawing machine with seven dies in tandem, in which the belt usually had to be replaced every six weeks, the new belting has served seven months and still is in satisfactory condition.

Another of many typical cases involves the drive for an automatic screw machine. With the former belting, a take-up each week was necessary. The new belting operates for months without stretching.

New Clutch Aligning Gage

The new clutch aligning gage recently designed by the Frisz Mfg. Corp., Indianapolis, for the Packard Motor Car Co., Detroit, has been so modified as to make it universally useful on all cars. This gage now is being distributed by Wagner Electric Corp., St. Louis, and Monmouth Products Co., Cleveland, and their jobbers.

40 Per Cent Ferrotitanium

Titanium Alloy Mfg. Co., Niagara Falls, N. Y., has started production of 40 per cent ferrotitanium. It has a carbon content of less than 0.1 per cent and is intended for use in the manufacture of 18-8, chromium-nickel, stainless steel.

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Sea Power

ON THE nineteenth anniversary of the battle of Jutland, in which the British won a strategic victory in spite of tragic tactical blunders, we recalled the published work of our own naval captain, later Admiral Mahan, on *The Influence of Sea Power on the World's History.* Her Majesty, Queen Victoria's Royal Navy certainly derived inspiration and world domination from Mahan's profound philosophy of sea power. Perhaps Kaiser Wilhelm was influenced by the same philosophy in challenging Britain on the high seas.

This nation is now engaged in probably its greatest program of building war vessels. Their light weight, speed and gun power indicates the dashing tactics of our first admiral, John Paul Jones, are being followed rather than the ponderous capital ship strategy of Admiral Mahan.

Sea Power Rules World

Some 150 of our warships recently completed maneuvers east of the 180th meridian in the Pacific trying to solve Problem 16. Later the Japanese navy maneuvered west of the 180th meridian to solve the other side of the same problem. Seapower, as Admiral Mahan conceived it, is being wielded in peacetime war games. Italy, by implicit consent of French and British sea power, embarks on adventures in Africa. Germany makes a weak and futile gesture toward challenging England's sea power and is promptly squelched. Sea power still rules the world.

Yet, the twentieth anniversary of the battle of Jutland may find a new conception of world power emerging —air power. With incomparably superior sea power, Japan backed down before a demonstration of air power by the Soviets on the Manchukuoan frontier. A thousand war planes within striking distance of Japan's land of inflammable homes stopped the military party in its tracks.

Captain Mahan was "discovered" by the American government ten years after Britain and Europe were building navies on his philosophy. Our own Gen. William Mitchell is an authority on air power in Europe and Asia now. Perhaps he will be discovered here before long.

4 Per Cent per Month

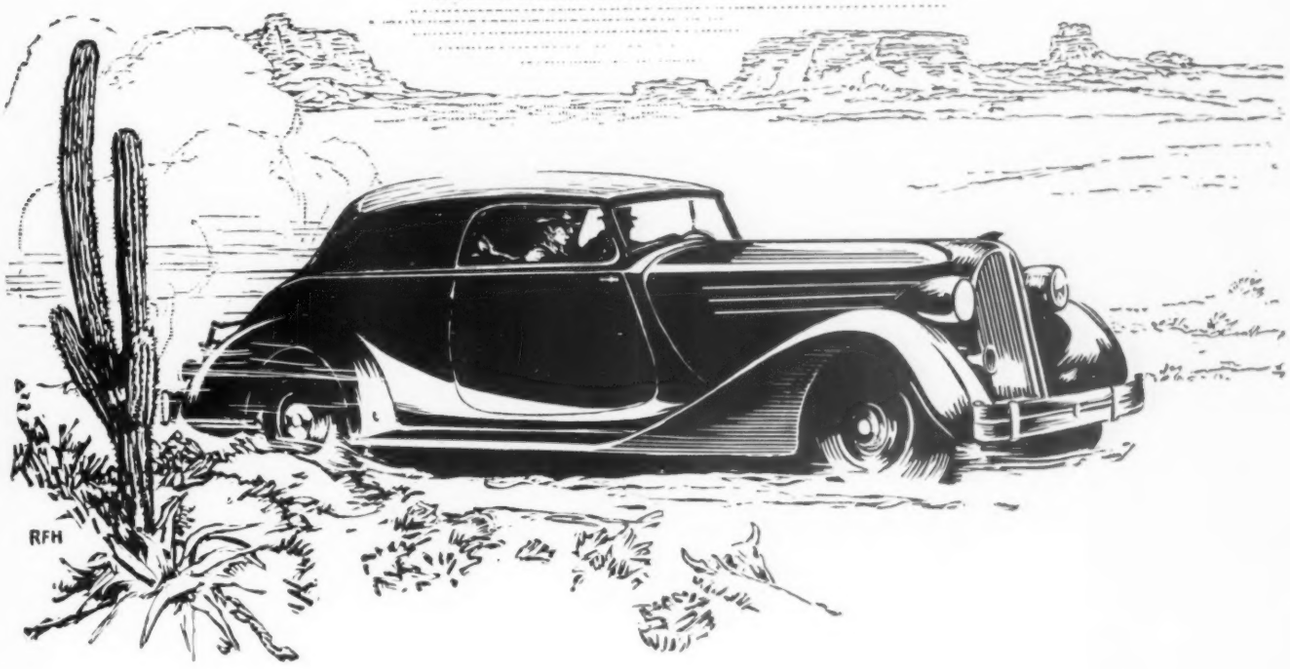
Using ¼-inch diameter shielded arc welding rod with 450 amperes current in the arc circuit to make an edge weld between two sheets of 16-gage steel is a recent application of arc welding. The answer is positioning, and turning the job so fast that the desired weld is obtained. The job is in welding the end in a muffler used on automobiles.

Using this amount of heat on 16-gage steel means that if the job ever stopped, the arc would blow a hole you could throw a cat through. On the average, welding costs should come down about 4 per cent per month. This is a measure of the rapidity with which developments are being made in the welding field.

Nuts

The well-known automobile manufacturer who does not believe in lock washers has created a market for small arc welders. Recently the steering column of our gas buggy practically fell out on the road. We stopped at six garages before we found one with an arc welder. A little weld on one side of a nut will prevent it from backing off. With several million of these cars falling apart all the time, it seems likely there are good sales possibilities for the small garage welder.

ENDURANCE!



Since the inception of the automotive industry, millions of Nickel Alloy Steel parts have been used by prominent manufacturers of motor cars, trucks and busses. Their service records are eloquent testimony to the endurance of these steels.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET, NEW YORK, N. Y.

NICKEL ALLOY STEELS

To Buy or Not To Buy?

C. N. KIRKPATRICK

Secretary and Sales Manager,
Landis Machine Co.,
Waynesboro, Pa.,

SAYS:

CAN you afford *not to buy* modern machine tools?" This applies, of course, to all plants, generally speaking, but we understand that it is to apply particularly to the metalworking plant.

The management of any metalworking plant alive to existing conditions and awake to keen competition will, with some reservations, reply negatively to this question.

Determining Obsolescence

The seller of modern machine tools must use some common sense and must acknowledge the judgment of the buyer when endeavoring to replace machines that are termed obsolete. In every plant there are machines many years of age and commonly known as of obsolete design which are performing just as efficiently for certain simple jobs as their counterparts of latest design. In many cases it would be economically unsound to enter upon a program of replacing every machine simply because it may be ten years of age and may not be strictly modern.

When is a machine tool obsolete? This depends entirely upon the design of the manufacturer's product, the quality he wishes to maintain, and the production desired. It may be that a change in design of any product and the stepping up of quality may obsolete a new machine after several months. The machine tool builder is keenly alive to any changes in the conditions of metalworking plants and therefore when an improved design of machine tool is required to meet the changed conditions, the machine tool manufacturer is prepared. There is, therefore, no definite period or no prescribed condition whereby anyone may say that a machine tool is obsolete.

In the gretat majority of cases where machine tools of modern design are installed, the results may be extremely startling in improvement of product, higher production, and resultant lowering of costs.

A Matter of Arithmetic

In our own experience, we have noted cases where a customer's costs were several hundred per cent higher with old thread cutting equipment than with new threading equipment, and at the same time the product was improved greatly. It is a simple matter for any user of machine tools to determine the value of replacing equipment. Any machine tool builder will gladly submit definite facts and figures regarding production so that it is only a matter of arithmetic to determine whether or not the modern machine will make a profitable installation.

It must be remembered also that a

". . . . a machine tool, after it is installed, is depreciated year after year. The manufacturer who does not replace equipment regularly in an endeavor to equal the depreciated value is headed for a rude awakening," warns Mr. Kirkpatrick in his contribution to STEEL's series of articles focusing attention of industrial executives on modernization in the field of capital goods. Seven leaders in the machine tool industry now have addressed readers on these pages. In succeeding issues further comment on this timely subject w ll be presented.

machine tool, after it is installed, is depreciated year after year. The manufacturer who does not replace equipment regularly in an endeavor to equal the depreciated value is headed for a rude awakening. We find many manufacturers think the best policy is to replace depreciated equipment and avoid the accumulation of cash in fear of some form of taxation which may later penalize them greatly.

Closer Limits on Threads

Every machine tool builder, of course, feels in his particular line the need for modern equipment is absolutely necessary. We, likewise feel that at no time has it been so necessary for improved and modern threading machines, threading die heads, and collapsible taps to be employed. Greatly increased demand for closer limits in lead of thread, form of thread, and finish of thread have made it necessary for every manufacturer of thread cutting equipment to endeavor to improve his product. Added to this, the cutting of threads on many special alloy steels has made more difficult the high production of quality threads.

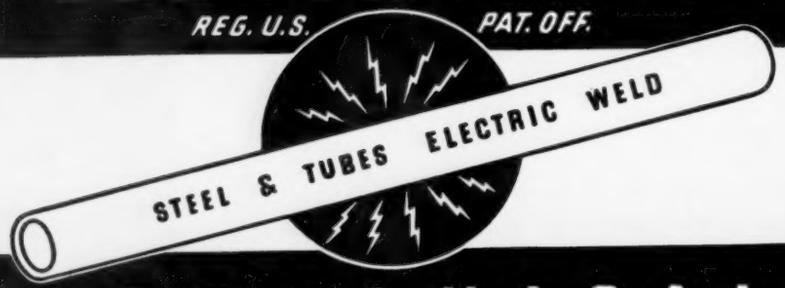
For some time it was thought that the greatest accuracy of threads was demanded in the automotive industry. To some extent this has been true and, of course, today manufacturers of automobile and airplane parts are extremely critical in their inspection of threads. Many, however, overlook the fact that threads on pipe and oil field tubular goods must be made to meet an accuracy today which some years ago was unheard of. Grade C and grade D seamless steel tubing employed in the drilling of deep oil wells must have threads to closer tolerances than are laid down by American Petroleum institute standards. It is not only necessary that lead and taper of thread be as near perfect as possible, but the finish must be very good.

Avoiding High Losses

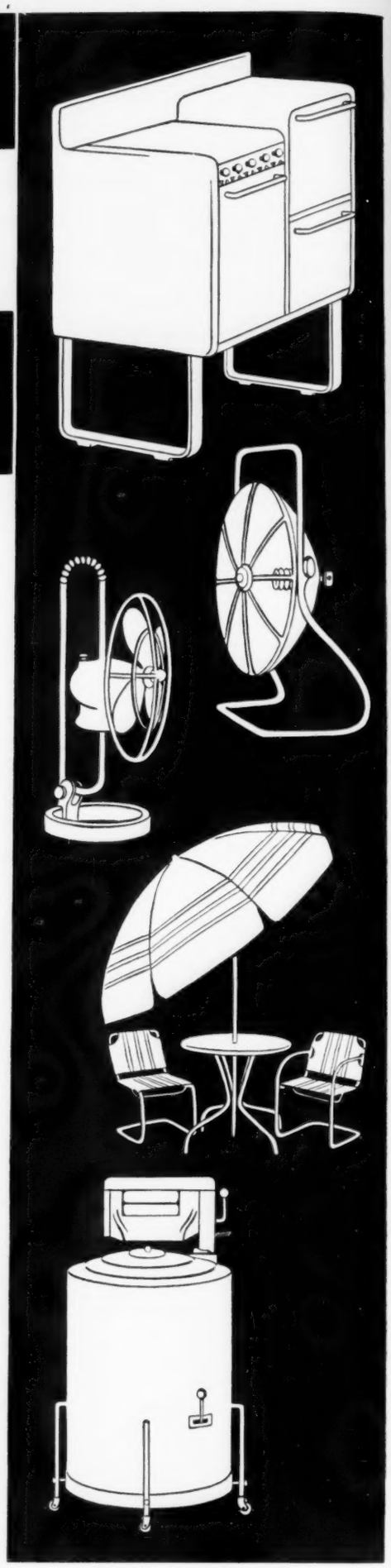
Many times the cutting of the thread is the last operation in the manufacture of a part. If the thread is incorrect and the part must be rejected the loss is many times that of the cost of the threading operation and, in some cases, many times that of the cost of the threading tool itself. It, therefore, behooves us as manufacturers of thread cutting equipment to spare no effort or expense to improve our products. By so doing, we make it possible for the user to improve his products and to reduce his costs so that a wider distribution may be had for the benefit of the public generally. We know this to be true of every manufacturer of machine tools today.

ELECTRUNITE

REG. U.S. PAT. OFF.



MECHANICAL TUBING



for BETTER DESIGN

The saleability of equipment for use in and around homes, hotels, restaurants and institutions of every kind does not always depend alone upon its appearance, upon its strength or upon its price. But when beauty in modern design and finish, low price and strength to withstand hard service are combined, they present a sales argument that is hard to beat.

Steel tubing made the Electrunite way does just that. It is the strongest structural member available per unit of weight. It permits of novel design and the use of artistic finishes. Its cost is comparatively low. It fabricates without difficulty.

Perhaps some of the items you are now manufacturing could be improved in appearance, made stronger or lighter, or be given a finer finish through the use of Electrunite Mechanical Tubing. Let us send you suggestions and quotations.

Steel and Tubes *Inc.*

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

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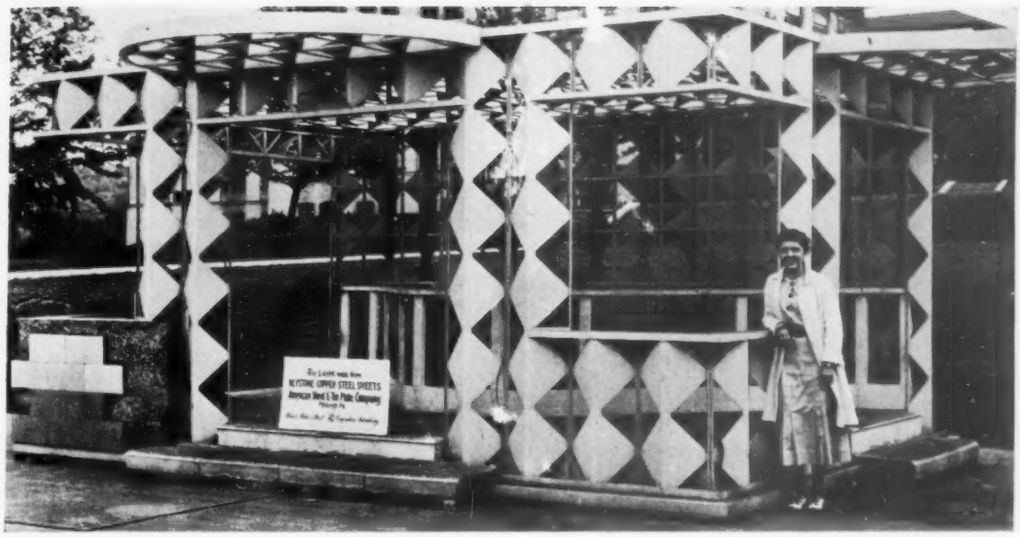


Copper-bearing steel sheets and angles are used to make up wall, floor and roof units of this structure exhibited on the campus at Carnegie Institute of Technology, Pittsburgh. Note partial exterior finish at lower left—terra cotta blocks mounted on insulating composition backing

Lightweight Steel Units Are Used in Novel Structure

BY E. A. FRANCE JR.
Associate Editor, STEEL

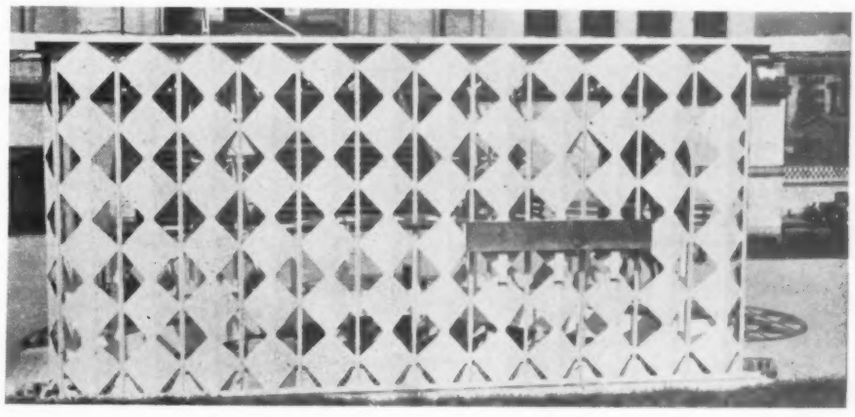
LIBERAL use of copper-bearing steel sheets and of small rolled steel or pressed steel angles is a feature of a novel type of steel house recently constructed at Pittsburgh. The building, designated as one of the so-called "frameless" type, has been erected on the campus of Carnegie Institute of Technology by its designer, Walter H. Stulen, a registered architect in Pittsburgh and a member of the Carnegie Institute's faculty, working in conjunction with the American Sheet & Tin Plate Co., Pittsburgh.

Though the present exhibit is one of a small residence, it is intended to demonstrate the possibility of making a basic steel structure that can be eventually adapted to buildings of various shapes and sizes, preferably of limited heights, and to demonstrate further how this type of basic structure can be covered with any desirable material. Wood, terra cotta, stainless steel, porcelain enameled sheets or architectural glass are equally adaptable as materials for finishing the structure's exterior. It is also feasible to design and build an exterior facing of brick and stone.

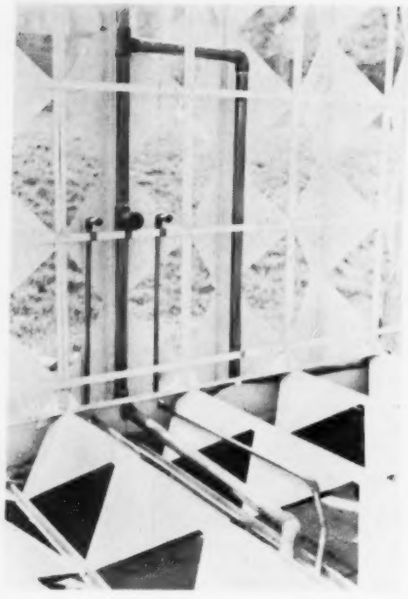
Floor, ceiling and walls of the building follow the use of a weight-saving unit, constructed in varying lengths and horizontally welded next to one another. The detail of the construction of these units is shown in an accompanying illustration.

These units are formed out of three angle sections, spaced parallel. The center of these three members is a 1 x 1 x ⅛-inch steel angle and each of the two side members is a ¾ x ¾ x ⅛-inch steel angle. To these angles, 16-gage copper-bearing sheets, pressed into standard shapes, are spot welded both to center and side angles. The sheet members are given a slight bend from the top to lower corners before they are welded. To insure rigidity these sheet squares are spot-welded to the side angles at 18-inch intervals and to the center angle, every nine inches. Formation of the sheet units makes square shapes on the flat pattern drawing. A module system of measurement is used in the design of these standard building units. At present it is 18 inches per square, or four squares to the square yard.

The rigidity of this building classifies it with earthquake-proof structures, yet its light weight is an important feature. For an ordinary installation, such as found in a residence, this type of house would average in weight but 3 pounds per square foot in covering area. This weight per square foot is an average



Rear view showing unbroken wall surface and indicating how wood may be attached to steel wall



Closeup view of utility lines run inside the floor and wall units

of the entire structure considering not only walls, but roof and flooring. For projected buildings, other than residential where greater strength is requisite, the average deadweight per square foot would naturally increase, but the design would still retain a considerable saving over solid building members.

Though steel is the basis of this building's construction, another feature is the economy in the use of this material in the frame. Only 2/3 to ¾ of a square foot of sheet steel is required for every square foot of space-covering area. To illustrate the amount of sheets required without the sacrifice of strength and rigidity: A wall 9 feet high and 20 feet long with an area of 180 square feet, requires about 120 square feet of sheet steel. Furthermore, from the standpoint of costs, since the sheet sections are square cut on zigzag lines, there is a minimum of waste.

These individual building units can be nested together in V-shapes troughs and economically shipped to an assembly shop for welding into convenient sized panels, or they can be dispatched direct to the building site for field welding. It has been found that in most instances it will be more economical to send these units to the building site, assembled into panels of channel sills, girts and the like; then field-welded into place.

Choice of Insulation

When the frame is completed, various types of insulation material can be fastened to the steel frame. As shown in the lower left of the illustration which heads page 51, Thermax, an insulating material produced by Harbison-Walker Co., Pittsburgh, has been used. However, asbestos, cement-insulated boards or any other type of insulating material can be used. Cabot's quilt or other makes of sound-deadening material can be used without interference in any way with standard practice.

The use of an approved metal strap is recommended to fasten such materials. Shown in one of the illustrations, these are clamped around the angle sections and additionally enclose wood strips which are set to run the entire length of each of the angles. Nail holes at the ends of the straps provide for their nailing to the wood section, thus firmly holding both together. There is no necessity for punching holes in the steel units or using bolts and nuts in any way as a means of support or anchorage of other materials except where explicitly called for by the manufacturer of various building materials. To these wood strips may be nailed the insulating material.

At present the Lumber institute of

Two types of galvanized 18-gage steel straps used to tie nailing strips to the metal units

Allegheny county, Pennsylvania, has prepared a practical demonstration of the use of wood finish on this basic skeleton steel frame. When completed, it will have white painted colonial wood siding on the exterior and wood paneled walls on the interior, with ceiling finished in acoustical tile blocks. In this case of an entire wooden finish, again the galvanized steel strap permits the use of wood on steel. These straps are placed every 18 inches on centers both ways.

In the application of a finished wood floor, wood sleepers are placed on top of the steel floor units without being fastened. On top of the sleepers the finished wood flooring is nailed. A rough under floor is recommended before the finished flooring is nailed. This method makes what is termed, a "floating floor" and is desirable because there is no metal such as nails, to conduct sound through the floor construction. Before the wood sleepers are placed in position, a layer of sound-deadening felt is loosely laid over the tops of the floor units.

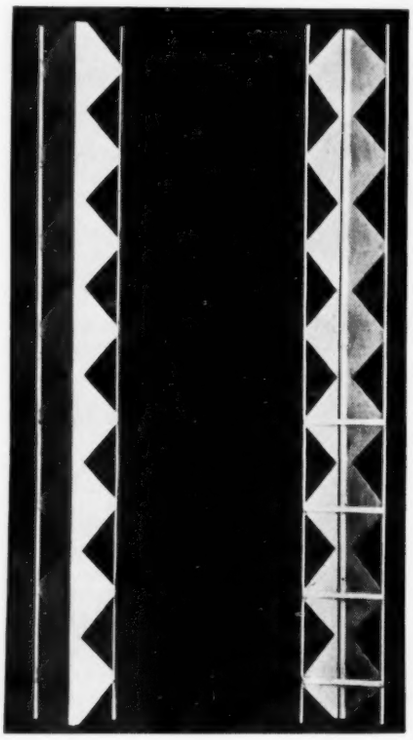
Fireproof floor and roof construction may be used, such as reinforced concrete slabs 2 inches thick laid over the standard steel units with a layer of metal fabric embedded in the slabs. Such a construction would provide for a finished cement floor or roof. Waterproofing materials can be employed in the standard way.

Plumbing, heating and other pipes can be run in most any direction in the walls, floor and roof, as illustrated. Flexible wiring can be run in a short diagonal outlet if necessary. The hollow and open spaces in the standard steel units provide ample space for the ordinary piping usually found in residences.

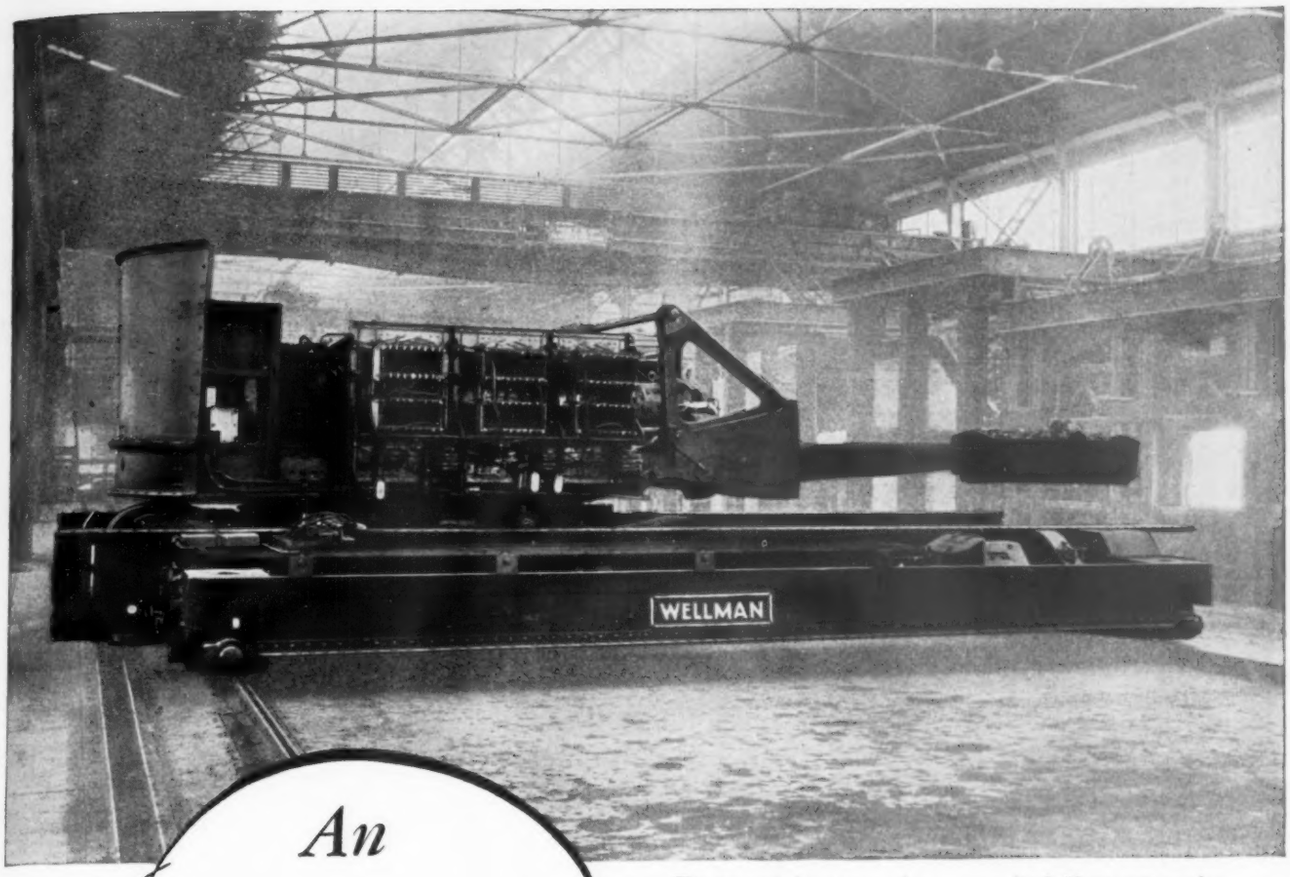
The house will be on public exhibit at the Carnegie Institute of Technology campus for an indefinite period. Parts of the walls, the floor and the roof are being completely finished in varying types of construction and with different materials. The unusual steel frame design is to remain uncovered, in large part, for public inspection.

White Paint Is Aid in Accurate Parts Machining

In its production line a large builder of machine tools puts a coat of white paint on parts to be machined so as to make it easier for the machinist to see what he is doing, particularly on inside surfaces. Later the machines are finished in standard machinery gray.



Front and rear of steel building unit showing how specially formed sheets are welded to vertical angles. These two models are cut slightly different from the units used in the structure on exhibit



This type of charging machine—completely Hyatt equipped—built by THE WELLMAN ENGINEERING COMPANY is operating in the open hearths of several leading steel plants.

An Assurance of Better Operation

Wherever installed in cranes, tables, cars, motors, charging machines or other mill equipment, Hyatt Roller Bearings provide capacity where it is most needed, reduce maintenance, and help speed up production.

No matter what their application these better bearings go on serving and saving under the most severe operating conditions. That's why more and more of these durable and dependable Hyatt Roller Bearings are employed each succeeding year in steel mill service. Hyatt Roller Bearing Company, Newark, Detroit, Chicago, Pittsburgh, Oakland.

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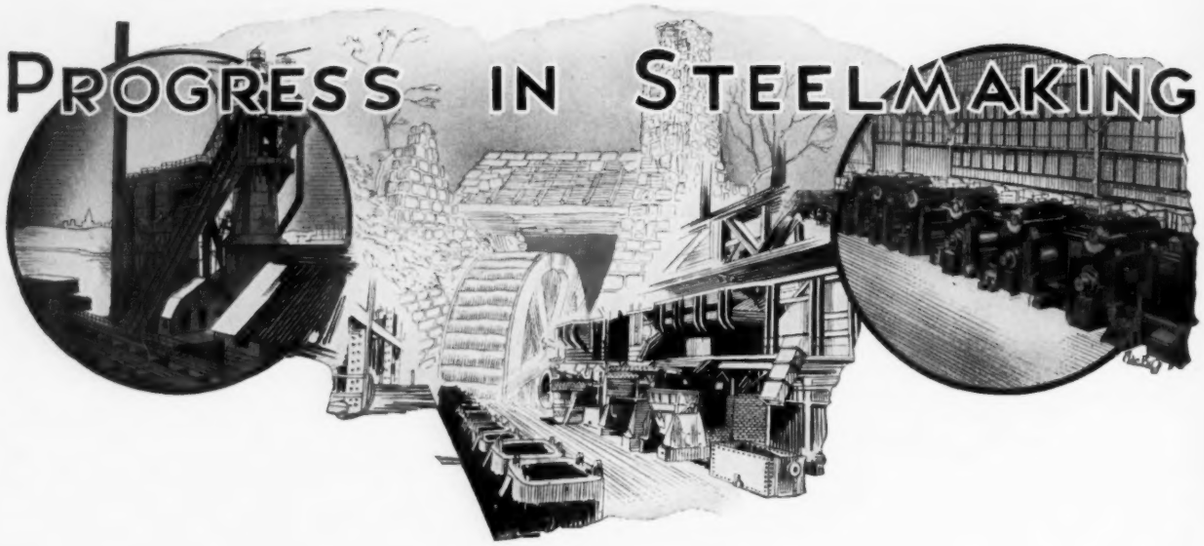
ROLLER BEARINGS

PRODUCT OF GENERAL MOTORS

PROGRESS IN STEELMAKING



Results in Bearing Failure

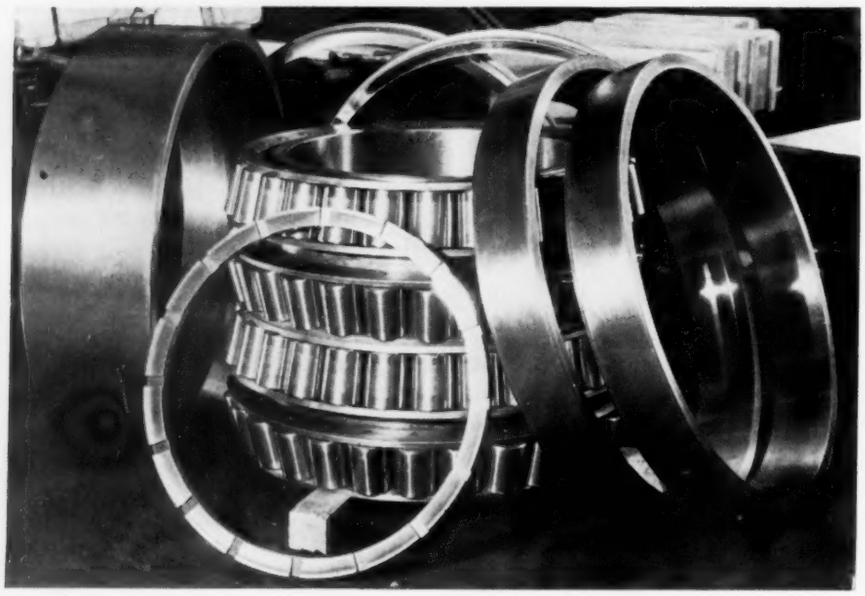
A large steel company some time ago adopted the practice of equipping its gas blowing engines with centrifuges for continuous cleaning of the lubricating oil. On a recent occasion a set of bearings on one of these engines burned out. Examination disclosed that the centrifuge had ceased to function on account of being completely clogged with the muck removed from the oil. The man in charge of the unit had become accustomed to the hitherto trouble-free performance of the centrifuge and neglected to give it the needed occasional cleaning.

• • •

Protects Metal Surfaces

Portland cement reground to exceeding fineness which serves as a pigment, specially process pure linseed oil and tinting pigments to make various colors form the basis of a coating for the protection of structural steel, galvanized sheets, tank cars, storage tanks and similar metal surfaces exposed to atmospheric corrosion. The coating has the same expansion and contraction ratio as the metal surface and, therefore, is not subject to the internal stresses that lead to cracking and peeling of paints from galvanized surfaces. The cement pigment kills the rust by changing the ferric oxide into ferric calcite. The material cost for a 2-coat application to galvanized sheets is about $0.90 a square.

Builds Bearings for 84-Inch Cold Mill



One of the largest roll neck bearings ever built is the 30 x 47 x 32-*inch Timken 4-row unit shown above. Four of these bearings will be in constant service in the Ford broad strip mill now being erected by the United Engineering & Foundry Co. at River Rouge, Mich. They will be installed on the backup roll necks of the* 20½ *and* 56 x 84-*inch single-stand reversing cold mills, where rolling loads as high as* 4,500,000 *pounds at* 25 *revolutions per minute are anticipated. In all,* 87 *different sizes of Timken bearings will be used, involving approximately* 185 *tons of special steel, which is believed to be the largest single order for antifriction steel mill bearings ever placed*

• • •

Welded Ladle Is Lighter

Where building, columns, cranes, runways and cranes in open-hearth shops do not permit handling larger size heats the results can be obtained by the use of the welded ladle which is about 25 per cent lighter than the ordinary steelworks ladle of the same capacity.

• • •

Tapered Tread Is Efficient

Twisting of overhead traveling cranes with excessive wear of the wheel flanges is traceable to the use of flat-tread wheels. Much of the flange wear as well as the thrust on the track wheel bearings is eliminated by using wheels with a tapered tread.

• • •

Ingot Mold Life Varies

Chemical analysis when within reasonable limitations have no influence on the subsequent life of ingot iron molds, according to tests conducted at an English open-hearth shop. In some instances molds of

identical analysis gave 13 and 120 ingots respectively before failure. The best campaign recorded was given by an iron containing 1.45 per cent silicon and 1 per cent manganese. The best average mold life was afforded by metal containing 1.8 per cent silicon and 1.2 per cent manganese. Ingot molds should not be exposed to the weather between pourings, inasmuch as exposure causes them to rust and any minute cracks to open out further. Corrosion stresses, which result, shorten the life of the mold materially.

72-Inch Cold Mill Nears Completion

OPERATION of the new continuous cold strip mill which Youngstown Sheet & Tube Co. is building at Campbell, O., as an adjunct to its new hot mill, is expected during the next few weeks. The new unit is a three-stand, 4-high continuous mill which will roll up to 72 inches wide, with a capacity of 150 to 200 tons per eight hours.

A continuous pickling unit, about 350 feet long, leads from the end of the hot mill to the cold mill. Coiled strip from the hot mill is placed on a coil box and unwound, passing through a flattener, then through shears which trim off the uneven ends, and thence through a machine which stitches the ends of each strip to the next. This makes the pickling a continuous process. The strip travels through the pickling tanks at about 80 feet a minute.

After pickling, the strip passes through shears which shear off the stitches and the strip then is recoiled and carried by conveyor to the cold mill delivery table.

Cut Made by Flying Shear

After cold rolling, sheets are cut to desired widths by a side shear, roller leveled and then cut to desired lengths by a flying shear. Sheets designed for stamping or forming are box annealed to give them the desired temper and drawing qualities. After box annealing, they are given a "skin pass" through a single stand of rolls to perfect surface qualities and relieve strains, and again roller leveled. After testing and inspecting, they are ready to be shipped.

In addition the mill includes a single stand 93 inches wide with which the company is planning to pioneer in the rolling of sheets up to a width of 90 inches. This will be done by cross rolling; that is, strip which is passed through the continuous cold mill will be cut into, let us say, 90-inch lengths, and then passed sidewise through the 93-inch single stand to give it the desired width.

Sheets rolled on the cold mill are particularly adapted to use in the automobile, metal furniture and electric refrigerator fields. It is expected that about one-third of the strip rolled on the hot mill will go through the cold mill also.

Training Foremen To Aid Better Industrial Morale

Foremanship Development, paper; published by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; supplied by STEEL, Cleveland, for $1, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Importance of supervisory forces in present-day industrial organization emphasizes the need for an adequate and simplified plan for training of foremen and other supervisors. The Westinghouse management presents such a plan in this volume, which may be adopted or modified by others seeking the same end.

The work is in three parts, the first briefly suggesting the importance of the foreman and supervisor in the industrial organization; the second presents practical suggestions for conference leaders, including underlying fundamentals, suggested methods, technique, self-evaluation for leaders and other factors; the final section contains outlines for 38 conferences on major problems of foremanship, with outlines for discussion on collective bargaining, foremen as managers and leaders, labor turnover, waste, etc.

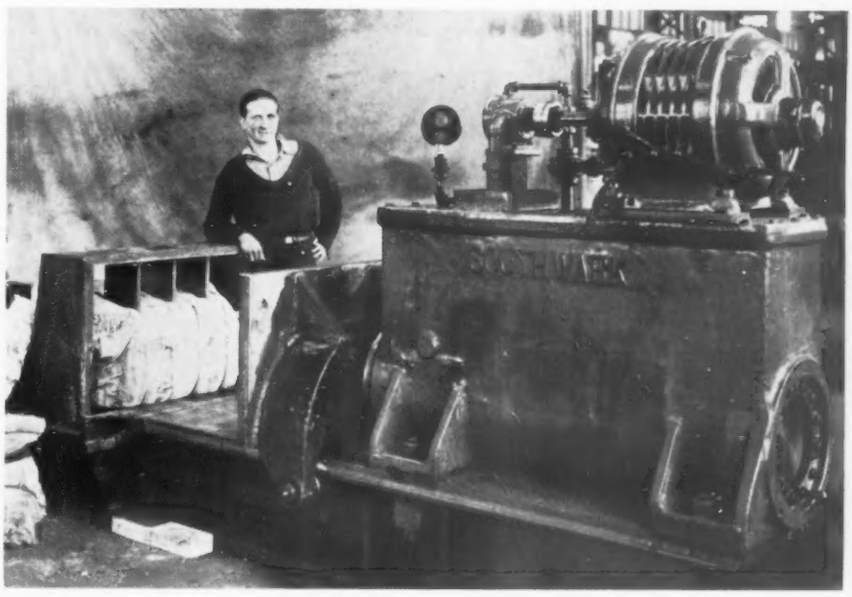
Improvement in Fire Hose Will Eliminate Twisting

A new method of laying fabric in wrapped fire hose to eliminate twist under pressure has been invented and patented by A. D. Maclachlan of the technical staff of the B. F. Goodrich Co., Akron, O. The new construction feature will be incorporated in White Anchor bias-laid fire hose, which is used widely for industrial plant protection. The fact that the hose remains straight when pressure is applied minimizes the danger of wild hose in emergencies, and greatly simplifies rewinding after use.

Launches New Publication

Electromet Review is the name of a new publication launched by the Electro Metallurgical Co., 30 East Forty-second street, New York. Its purpose is to bring to industrial executives in convenient and quickly readable form, news and views of the rapidly increasing uses of alloy steels and irons. The first issue, for June, contains six pages of articles and illustrations dealing with the uses of alloys.

Steel Cuts Rubber



NEW HIGH-SPEED, AUTOMATIC, HYDRAULIC SHEAR CUTS RUBBER in all varieties and in bales of any commercial size. The bed is of structural steel beams covered by a rolled steel plate. The shear box frame is of welded steel plate. Knives are rolled steel plate, fitted in slots for easy removal. Cylinder and tank are cast integrally of steel. The ram is of close-grained chilled cast iron. The tank is covered with a steel plate, which serves as a bed plate for the motor and pump. The new shear is manufactured by Baldwin-Southwark Corp., Philadelphia

GUARDIANS OF WASHBURN QUALITY

AT HARLEM RIVER PLANT

THE New York City plant at Harlem River and 118 Street employs over 1000 skilled steel workers, who take personal pride in their craftsmanship. Behind them is staunch New England wiremaking, rooted in a tradition nearly a century old. This army of guardians watch over your orders and hold them true to old quality standards.

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TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter III — Part II

Fantails

IN THE furnaces which have double slag pockets, that is, all of the typical furnaces excepting the D group, the volume of furnace gas flowing in either the air or the gas system is in the ratio of the areas of the downtake entrances, A_8 for the air system, to A_9 or A_7 for the gas system. This ratio is shown in Table LIII to vary within the limits 15:1.0 for furnace J and to 2:1.0, for furnace P. It will be obvious that with from two to 15 times the volumes of furnace gases flowing through the air system that pass through the gas system, and so long as the areas of the air system through the fantails is not more than twice the area of similar locations in the gas system, that the air system will be the more crowded of the two.

An inspection of the values of Table C will disclose that excepting in the cases of furnaces J and P the air areas at the fantails are always less than twice the gas areas.

Air Side Is Considered

Therefore, the discussion anent fluid flow is directed only to conditions on the air side for it will be obvious that flow conditions on the gas side will be inherently better than on the air side which represents the worst condition.

While the discussion will concern the air side under maximum proportionate volumes of furnace gas it should be noted and it will be later commented on that by manipulation of the equalizing dampers of the flue systems a greater proportion of furnace gas may be caused to flow in the gas system. This condition, however, will have no particular effect on the factors to be discussed.

The total volume of furnace gases flowing in the air system has been calculated and shown in Table XCIII. For furnace groups A, B and C the ascribed volume is given in column b, and for the D group furnaces, in which the gas is presumed to be equally distributed to both the gas and air system on a ratio of the critical fantail areas, in column a. The furnace gas temperature through the fantails is assumed as 2850 degrees Fahr. from Fig. 113, and the thermal factor 2.594, found by interpolation from the higher and lower factors of Table LVIII. By the use of the foregoing and in addition the appropriate figures of area, Table C, the relative velocities of the furnace gas through A_{11} or A_{10} if it be the smaller, may be found through the solution of equation (51) thus:

$$\text{Relative velocity}^* = \frac{\text{Gas Volume}^* \times 2.594}{\text{Area}} \quad \ldots\ldots\ldots (51)$$

The assembled data for each furnace and the solution of its relative velocity is presented in Table CI.

A general reason for the consistently higher velocities of the furnace gases in the producer and mixed gas fired furnaces is found in the fact that the relative gas volumes are considerably greater from the firing of these fuels than they are from the fixed fuels, under equal heat release.

*As at 32 degrees Fahr.

Table CI

Max. Gas Velocity Through Fantails

(Typical Furnaces)

Furnace	Furnace gases through air system ft.³/ sec.@.32° Table XCIII a	Smaller of air areas A_{10} or A_{11}, ft.² Table C b	Gas velocity ft./ sec @ 32° Equation (51) c
Group A			
A	350	43.8	20.7
J	360	74.8	12.5
K	364	47.2	20.0
N	446	38.1	30.4
O	503	38.1	34.5
Group B			
I	199	52.6	9.8
P	206	75.6	7.1
Group C			
G	207	39.6	13.6
L	234	48.1	12.6
Group D			
B	192	71.2	7.0
D	180	53.6	8.6
E	229	54.6	10.9
H	210	65.7	8.3
F	220	77.8	7.4
M	247	67.5	9.5

The velocities noted are relative as at 32 degrees Fahr. The figure presented is actually the velocity as cold multiplied by the square root of the expanded volume at the specific temperature. Thus, the actual velocity of the expanded gases will be the figures of Table CI, column c, multiplied by the square root value or 2.594 for 2850 degrees. However, the dynamic head and the momentum of the gas stream will be in accordance with the figures given. A complete description of the methods employed in determining relative velocities and their comparative use will be found in the May 15 and 22, 1933 issues of STEEL in which the advantages found through the use of relative velocity figures in design or analysis is explained fully. The method is used throughout the current treatise and any unqualified reference to velocity refers to relative velocity as computed by the method.

Temperature Is Lower

Without any thought of regenerator size or efficiency it is general knowledge that the temperature of the effluent gases at the outlet of the regenerators is usually 200 or 300 or even more degrees lower with fixed fuel firing than with producer gas firing. While the difference in gas volume has much to do with this condition, a considerable reduction of regenerator outlet temperature will come from lower velocity which among other factors of improved operation premises a better distribution of gas to and more effective action of the checkerwork.

At this time the only comment with regard to the gas velocity entering the regenerator chamber will be the statement that it should be as low as possible and in no event to exceed 9 and 12 feet per second relative velocity for fixed fuel fired and producer gas fired furnaces, respectively.

Examination of the plan sections of the typical furnaces, Figs. 126 to 129, will show that only in the fantails of furnaces K, P, L and B have areas $A_{11}A$ and $A_{11}G$ been developed to the full width of the regenerator

chamber. It is a fundamental of open-hearth design that the width of area $A_{11}A$, or $A_{11}G$ should be the same width as the regenerator chambers with which they are connected. An enlargement of the width beyond A_{11} in the regenerator chamber not only produces the effect of an orifice in the line of flow producing eddy currents and turbulence in the gas stream but also causes the shielded corners of the checker work to become ineffective.

The condition described is seen in particularly aggravated form in the regenerator connections of furnace G, D and H.

Interferes with Flow

Most designers have insisted that heavy cast steel corner angles be placed at the ends of the regenerators to bind the side wall of the regenerators longitudinally. Where this is done conventionally the width of the fantail at A_{11} is narrowed to produce the condition which thus interferes with flow.

There are several methods of binding the sidewalls so as not to cause the abridgement of the width of A_{11} which will be described in a subsequent chapter.

Specific criticism is directed to the typical fantails individually as follows:

FURNACE A: The abridgement of width, particularly at A_{11}, together with generally cramped design are responsible for the high velocities, Table CI. Also for the considerable horizontal angularity, Table XCIX.

It is unfortunate that a common regenerator center wall was not incorporated in the original design, for it is obvious such construction would minimize many if not all faults of velocity and distribution.

FURNACE J: Liberal and good design which would have been improved by the elimination of the corners at the regenerator entrance. It is thought the steep bottom slope will cause undue erosion on the regenerator roof. An improvement in flow lines would occur if the slag pocket end wall was extended upward until the areas at A_{10} were but 10 or 15 per cent greater than at A_{11} and a new fantail bottom developed to the new slope.

Design Is Recommended

FURNACE K: The air regenerators are angled towards the stack to reduce the angularity of gas flow in the waste system, a most excellent design. The gas velocity, Table CI, appears high. This as the smaller of areas A_{10} or A_{11}, Table C were used as governing the velocity into the regenerators. On account of the slowly diverging lines of the fantails, it is likely in this case, that the velocity of the gas entering the regenerator would be governed by area $A_{11}A$ in which event the relative velocity would be about 12.3 feet per second,

Table CII

Refractory Schedule of Typical Fantails

Fan-Tail	Roofs a	Side walls b	Center walls c	Bottoms d
GROUP A				
A	12"—S	18" Min. S	18" Min. S	24" F on Mass
J	18"—S			13½" F—2½" IE
K	18"—S			
N & O	12"—S—4½" F	18" Min. S	18" Min. S	24" F on Mass
GROUP B				
I	12"—S	18" S—IC Fill	18" S—IC Fill	20" F
P	13½" S	13½" S—R Fill	27" S	9" S—9" R
GROUP C				
G	12" S	13½" S—4½" IB—R Fill	13½" S—4½" IB—R Fill	12½" F—4½" IB—4½" R
L	18" S	18" S—4½" IB—R Fill	18" S—4½" IB—R Fill	20" S on Mass
GROUP D				
B	13½" F—4½" R—4½" ID	18" S + R Fill	18" S + R Fill	13½ F on Mass
D	9" S	13½ S—R Fill	27" S	18" S
E	13½" S—4½" IB	9" S—9" F	9" S—9" F	9" F on Mass
H	12" S	9" S—F Fill	31½" S	9" S—4½ IB—4½ R
F	12" S—2½" IB	13½" S—4½" IB	13½" S—4½" IB—R Fill	12" S—4½" IB on Mass
M	13½" S—4½" ID	13½" S—R Fill	27" S	18" S

Legend:—
S = silica brick
F = first quality fire brick
R = common brick
IB = class B insulating brick
IC = class C insulating material
ID = class D insulating material
IE—class E insulating concrete

instead of the value, 20, used. The excellent operating records of this unit confirm this condition to exist.

FURNACE N: Same comments as for Furnace A.

FURNACE O: Same comments as for Furnace A.

FURNACE I: Flow values are rather high. A reduction of the corners at the regenerator entrance would be a great improvement as well as a reduction of the slope of the fantail bottoms.

FURNACE P: Operations likely would show betterment if bottom slopes were decreased and also roof slopes if possible.

FURNACE G: Poorly designed in plan, and should be redesigned entirely and rebuilt to reduce the obvious faults.

FURNACE L: Well designed but the bottom slope appropriately should be modified to flatten the line of flow. The velocity figures would be improved were the sill at the entrance of the regenerators dropped a little causing over enlargment of A_{11}.

FURNACE B: The flow values through this fantail are good. However, this is another case in which operations would be much benefited were the regenerators designed with a common center wall. This would decrease the considerable angularity in plan of the air side and the regenerators would function more effectively as a consequence.

FURNACE D: Poorly designed particularly in plan, these fantails should be redesigned and rebuilt.

FURNACE E: The controlling areas are too small to correctly take care of the gas volumes from the high production rates at which this unit is operated. The use of the semi-circular roof shown and unique in this design, is not good practice.

FURNACE H: The design of this fantail in plan is poor. Redesign and rebuilding should be well worth while.

Would Improve Operations

FURNACE F: The design of these fantails is liberal and good, but operating betterments would be found had the corners at the regenerator entrances been reduced. It would have aided flow conditions had the 7½-inch drop of the arch at the regenerator entrance been omitted.

FURNACE M: This discloses a three compartment regenerator chamber, unique in American open-hearth practice.

On account of the high production rate at which this furnace is operated but more particularly on account of lack of space under the charging floor it is doubtful if a material improve-

Table CIII

Data on Fluid Flow in Proposed 150-Ton Furnaces

Tons produced per hour a	Critical Areas, sq. ft. A_2 b	A_5 c	A_6 d	A_8 f	Furnace gas, ft.³/sec. i
Producer Gas Fired Furnace					
13.9	58.08	4.95	57.2	62.15	400
Fixed Fuel Fired Furnace					
14.75	52.96	....	58.38	....	265

LEWIS TABLES

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LEWIS Foundry & Machine Company makes Furnace Runout Tables, Merchant Mill Tables, and Blooming Mill Tables, as well as tables for all types of rolling mill equipment.

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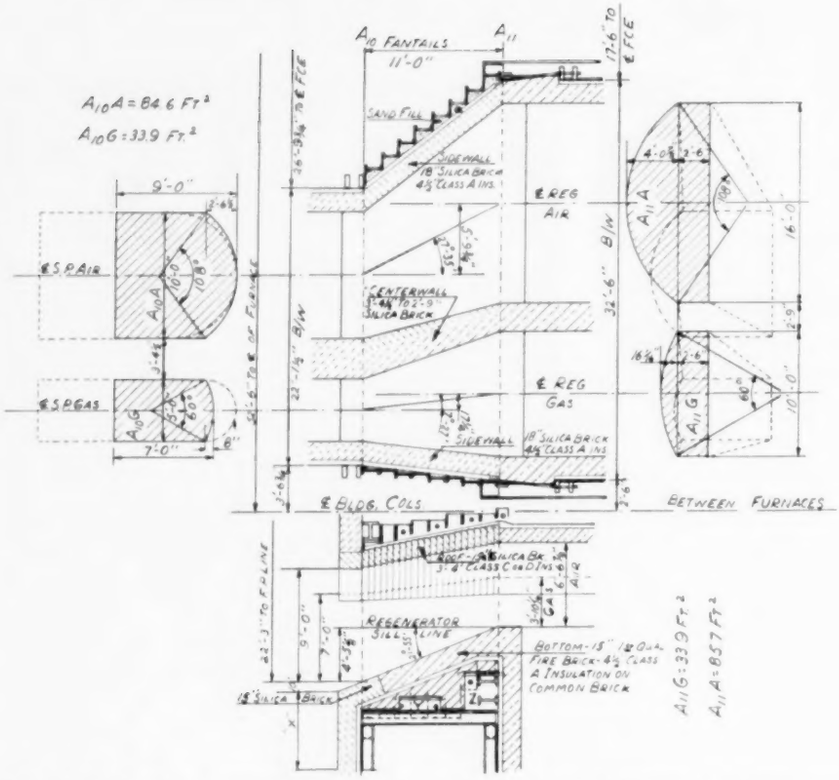

Fig. 130—Lines and refractory details of fantails for a 150-ton producer gas fired furnace

ment of the poor fantail design could be achieved.

By the time the effluent furnace gases reach the fantails, they have dropped to a temperature under the effects of which but little if any gas erosion of silica brick will take place, the furnace gases by action within the slag pockets have been freed of entrained matter which is destructive to plane brick surfaces and consequently the problems of refractory maintenance encountered on the furnaceward side of the fantails rapidly are disappearing.

Insulation Is Recommended

Customarily silica brick are used in the roofs, side and center walls. First-quality fire brick is used mostly in the bottoms but some operators prefer silica brick. All components should be and in the later designs generally are insulated. The schedule of refractories as found in the typical furnaces is listed in Table CII.

In view of the many differences in detailed design of the refractory components in the several typical fantails little will be gained by a comparative analysis and it will be better to develop refractory details and thicknesses on sound thermal and economic lines, bearing in mind the common practice.

Throughout the several sections of this treatise, and after specific criticisms have been offered of the design of the various components of the typical furnaces used as the basis of the work, designs are presented that eradicate the faults of the typical furnaces and which offer more nearly ideal lines and structure. Carefully conceived designs are offered through the use of which improved 150-ton furnaces may be constructed, fired with either producer gas or the fixed fuels.

In Volume 2, which will be published later, certain data are developed in Chapter VIII which offer a basis for the appropriate flow calculations in the improved furnaces. These are presented in Table CIII and are comparable with similar data developed for the typical furnaces and offered in Table XCII.

Arrangements Are Presented

With these figures in mind, particularly the volume of flow, the appropriate fantail lines and refractory arrangements have been designed and are presented in Figs. 130 and 131. These continue the design of the 150-ton furnaces, and Fig. 130 shows the producer gas fired furnaces, laid out as with the building column spacing between furnaces at 105 feet while Fig. 131 is the fixed fuel fired arrangement laid out at the 100 foot column centers.

As previously stated, the factors that chiefly will govern the layout of the fantails in plan are the slag pocket layout as to width and arrangement of the openings into the fantails and the spacing between the slag pockets and the limiting building column line or footings; and, at the regenerator end the allowable minimum spacing between the same building column line and the regenerator

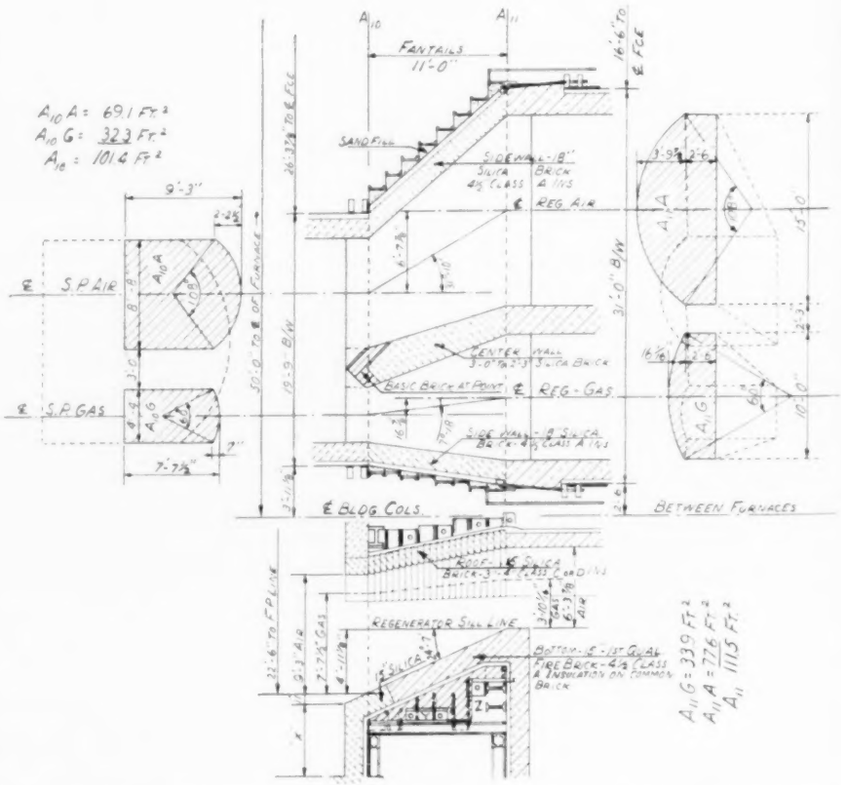

Fig. 131—Lines and refractory details of fantails for a 150-ton fixed fuel fired furnace

walls, as well as the desired width of the regenerator chambers and their layout. The length available for the fantails, which is dependent on building layout in depth, is an important factor in the developed angularity.

At the selected column spacing the clearances shown at the slag pocket ends are as found after the complete development of the recommended furnaces and are thought to be ample. At the regenerators the space allowed, 5 feet between adjoining regenerator walls, and about 3 feet between steelwork, is assumed as sufficient for the proper inclusion of the necessary charging floor columns.

The length of the fantails, 11 feet, is arbitrary. Obviously, a shorter length would increase the angularity of the layout while a longer length would decrease it.

In accordance with the grading of the typical furnaces in respect to angularity, Table XCIX, the proposed producer fired furnace would be rated "good" and the fixed fuel furnace "fair."

Depends Upon Three Factors

The elevation of the top of the air fantail inlet $A_{10}A$ has been shown to be established by the necessities attendant in the development and location of the slag pocket tie beam UTS, Figs. 119 and 120, and as developed is 13 feet 3 inches below the foreplate line. The height to which the regenerator roof can be carried and that governing the elevation of the top of the regene ator airside inlet, $A_{11}A$, will depend on the depth to which the charging floor steel is carried, the thickness of the brick of the regenerator roof and the requirements for regenerator binding steel and its clearances. In the presented design it is assumed that 5 feet will be ample depth for the charging floor and its supporting steel, and that the regenerator roof thickness, the binding and the necessary clearances can be included in 3 feet 9 inches. Accordingly, with the 2 feet 6 inch dimension between foreplate line and top of charging floor a total of 11 feet 3 inches will be the dimension between the foreplate line and the top of area $A_{11}A$. Accordingly, the top of area $A_{11}A$ will be 2 feet above that of area $A_{10}A$ establishing the fantail roof slope.

Ample regenerator depth will be shown as important and thus the greatest convenient elevation should be arranged for the top of $A_{11}A$.

The development of areas A_{10} and A_{11} to produce the desired gas velocities is then in order. Obviously, the depth of these areas will control the slope of the fantail bottom. They should not be unduly acute. An angle that does not exceed 25 degrees from the hofizontal will be found satisfactory.

(To be continued)

Truck To Tour Country, Demonstrating Machines

Andrew C. Campbell Division of American Chain Co. Inc., Bridgeport, Conn., recently started a demonstrating truck on an extensive trip that will cover all important industrial centers in the country. The primary purpose of this truck is to educate dealers and salesmen more thoroughly as to the many features of Campbell nibbling machines and Campbell abrasive cutoff machines.

A schedule is arranged so that as soon as the truck arrives in the dealer's city or town, a meeting is held with the dealer and his sales force. The meeting is conducted by a Campbell sales engineer who accompanies the truck.

Immediately behind the driver's cab is located in a separate compartment an independent power plant which drives a generator which supplies electric current required for the operation of the machines, lights and ventilating system. Each of the three machines on the truck—one nibbling machine and two cutoff machines—is equipped with individual motor drive and can be operated under exactly the same conditions as would be found in a plant. This means that after the educational meeting with the dealer's sales force the truck can be driven to the plant of a prospect and a convincing demonstration made, cutting or nibbling actual materials used on a job in the plant.

The demonstrating compartment is entered from the rear by means of steps which fold down. While a demonstration is being made a double chain guard is placed across the rear as a safety measure.

Iron and Steel Engineers Plan Convention Program

A wide variety of topics will be discussed in technical papers to be presented at the thirty-first convention of the Association of Iron and Steel Electrical Engineers in Pittsburgh, Sept. 24-26. The convention will be held in the William Penn hotel and will run concurrently with an iron and steel exposition.

Among the subjects listed on the convention program are: Absorption of the products of strip mills; insulation of open-hearth furnaces; industrial relations; developments in the use of oxyacetylene process in the iron and steel industry; bright annealing; roof temperature control of open-hearth furnaces; processing of flat rolled steel; welding with the alternating current arc; runout table motors and generators for hot strip mills; alloy rolls for strip mills; lubricants for cold rolling steel; improvements in pouring molten steel; cutting oils; nonmetallic antifriction and oil bearings for roll necks; developments in the iron and steel industry during 1934-35; material handling; and welding and its possibilities in the steel industry.

T. B. Little, 1010 Empire building, Pittsburgh, is acting managing director of the association.

Stainless Lends Distinction

STAINLESS STEEL TRUCK BODY: Recently built by the Edward G. Budd Mfg. Co., Philadelphia, for Benjamin Moore & Co., New York, this vehicle recently was placed in service and is reported to be one of the first trucks built with an all-stainless steel body. An Autocar truck body was used and Allegheny Steel Co., Brackenridge, Pa., supplied the corrosion-resistant steel. Reduction in the body weight by about 50 per cent with a consequent increase in payload is claimed for this type of construction. Used in thin fluted sheets, stainless steel panels provide high strength, durability and pleasing appearance. Assembly of the panels was effected by the Budd shotweld process, used extensively on stainless steel assemblies for airplanes and railroad equipment

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THE AMERICAN ROLLING MILL COMPANY
Middletown, Ohio

NEW EQUIPMENT

These items of industrial equipment were announced by manufacturers last week and will be described in early issues of STEEL:

Oil-gas generator, Stewart Industrial Furnace division of the Chicago Flexible Shaft Co., Chicago.

New line of pumps, Acme Machine Products Co. Inc., Muncie, Ind.

Pulling and lifting tool, Yale & Towne Mfg. Co., Philadelphia.

General purpose magnetic clutch, Cutler-Hammer Inc., Milwaukee.

Proportional gas-air mixer, Philadelphia Drying Machinery Co., Philadelphia.

Thirty-five-ton straightening press and 15-18-ton molding press, Hannifin Mfg. Co., Chicago.

Mobile crane, Bucyrus-Erie Co., South Milwaukee, Wis.

New line of high-cycle electric tools and two new portable air tools, Rotor Air Tool Co., Cleveland.

Motor-driven drill grinder, Hisey-Wolf Machine Co., Cincinnati.

Milling machine, Kent-Owens Machine Co., Toledo, O.

Eight-inch flat belt cutting tool, Flexible Steel Lacing Co., Chicago.

Extensometer - type dynamometer, Falk Corp., Milwaukee.

Acetylene generators and welding torch, Linde Air Products Co., New York.

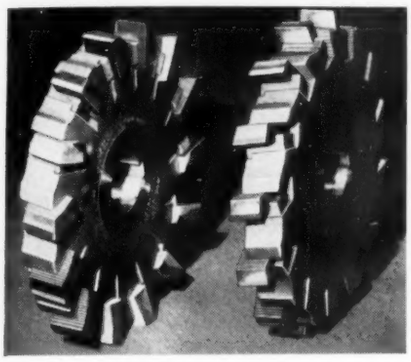
Total time meter, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Interchangeable breaker and sheet piling driver, Worthington Pump & Machinery Corp., Harrison, N. J.

New copper alloy, P. R. Mallory & Co. Inc., Indianapolis.

Side Milling Cutters—

Ingersoll Milling Machine Co., Rockford, Ill., has introduced inserted blade side milling cutters with its Zee-lock blades. Securely retained in the cutter housing by a Z-shaped wedge which hooks the front of the cutter body and the back of the blade, it is impossible for the blade to shift backward or inward away from the cut. The back hook of the wedge is on a slant so that when the cutter blade is reinserted and moved out a serration, it moves forward a slight amount, compensating for the slight amount of wear on the face of the cutter. No additional parts or shims



Halfside milling cutters, right and left hand, with Ingersoll Zee-lock cutter blades

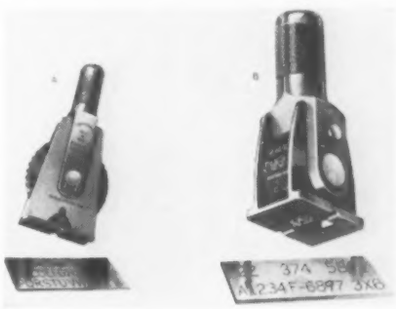
are required for resetting. Half side milling cutters, made right or left hand as shown in the illustration, incorporate the Zee-lock blade. Staggered tooth or alternate angle cutters may be readily resized for width as the alternate Zee-lock cutter blades move axially when adjusted radially for wear. Plain side and interlocking cutters with plain wedge locks also are offered. Cutters are made as small as 4-inch diameter by ½-inch wide. The cutter housings are made of forged and heat treated chrome-molybdenum alloy steel. Blades are of forged hardened and ground high-speed steel; also of Stellite or tipped with cemented tungsten carbide.

• • •

Metal Marking Machine—

Quality Die Co., South Chicago, Ill., announces two new machines for marking metals and metal products. One contains all the letters of the alphabet and the numerical digits 0 to 9 on a single wheel. A single character is impressed at a time but any combination of figures and letters may be obtained by turning the wheel. The second is a multiple wheel machine, being provided with any number of wheels from 2 to 9 or more, and each wheel contains 10, 12 or 14 characters, either figures or letters, or both if desired. Grooves cut into the face of the wheels between the deeply engraved characters fit over a small pin which insures alignment and acts as a reinforcement to a large shaft pin. This pin, as well as the larger shaft pin, is made of tool steel hardened to withstand the heavy pounding necessary to impress the characters in the surface of hard metal. Characters are kept in alignment by means of ratchets for each wheel. A guide plate enables the user to place the impression just where he wants it.

In both the single and multiple wheel machines, shown in the accompanying illustration, the shank holder moves downward when working through the base guide and goes back into place automatically after the impression has been made. Both machines are guaranteed to impress



These new Quality Die Co., metal marking machines obviate the necessity of having a set of individual marking dies and speed up the marking operation

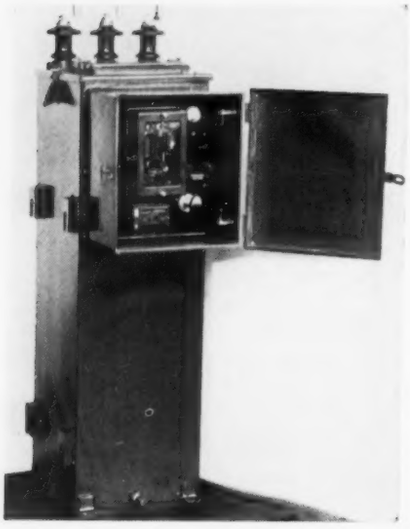
metals up to and including 415 brinell hardness. They are equally effective on fiber, leather, wood and other materials.

• • •

Induction Regulator—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has extended its standard line of type S submerged induction regulators to include units better adapted for general use. The new type retains basic features of the larger type but is simplified to reduce cost for small-capacity low-revenue circuits. No mechanical position indicator, no position indicating signal lights and no automatic neutral return are provided. Instead of these features, an electrical position indicator is supplied mounted on the control panel, shown in the illustration on Page 64. This indicator is not mechanically connected to the regulator but is rather a measure of its electrical performance and is calibrated to indicate the regulator position whenever the regulator is excited.

The new type SS regulator is equipped with a compensator type of primary relay offering both resis-



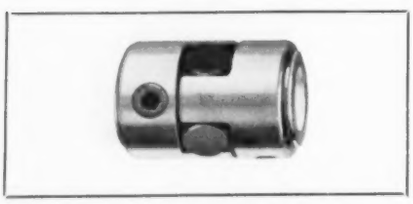
Westinghouse induction regulator, type SS, for small capacity circuits

tance and reactance in drop compensation. Regulator losses have been reapportioned giving consideration to balancing the cost of regulator against evaluation of the losses. By this means the operator is given advantage of the most economical design with respect to cost of the regulator and losses. No lubrication is required. Ruggedness and simplicity are emphasized.

♦ ♦ ♦

Flexible Couplings—

Lovejoy Tool Works, 4973 Lake street, Chicago, announces a line of flexible couplings known as Type IA and shown in the accompanying illustration. Instead of the conventional parallel jaw surfaces where the outer edges of the jaws bear on the cushioning spider, the new coupling has convex jaw surfaces that exert a rolling pressure when bearing on the spider arms. The convex surfaces proportion the spider arms so that the compression is substantially uniform, regardless of the extent to which each portion is compressed; thus each portion of the arm bears an equal share of the load. The jaw faces of the coupling approach each other with uniform wear over the entire surface of the spider arm in such a manner as to render it useful as a cushioning agent for the metal jaws until the spider is practically worn out. This new construction is said to increase the life of the cushioning spider approximately 50 per cent without increasing the outside diameter or length of the coupling and to reduce proportionally the frequency of disturbing the coupling or machine. Three-part construction, including two metal flanges and a 1-piece spider, makes for ease of assembly and installation. The new coupling is made with bores from ¼-inch to 3 inches.



Lovejoy flexible coupling has convex jaw surfaces that exert rolling pressure when bearing on spider arm

♦ ♦ ♦

Blueprinter—

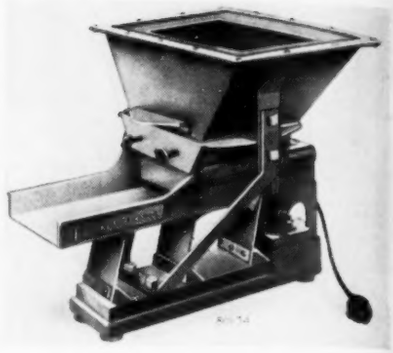
Milligan & Wright Co., 4711 Prospect avenue, Cleveland, announces a new model of the Angstrom lamp blueprinter. It is a floor model with novel arrangement for the washing and fixing trays and drying boards provided in the base. The accompanying illustration shows these trays extended for use. After using they slide back into the base. This equipment produces prints with exposures of ¾ to 1½ minutes, depending on the drawing and the paper used. A time switch cuts off the current at the end of the exposure selected. The new machine has capacity for one 18 x 24-inch or several smaller prints at one time.

Improved Milligan & Wright blueprinter has conveniently located trays and drying boards

♦ ♦ ♦

Electric Vibrating Feeder—

Jeffrey-Traylor division of the Jeffrey Mfg. Co., Columbus, O., has introduced a new type electric vibrating feeder, furnished with or without vibrating hopper. It is designed for accurately controlled feeding of reagents, chemicals, foodstuffs, small screens, grinding mills, belts, elevators, packing devices and automatic scales. Capacity of the feeder varies with handling conditions and nature of the material. Without the vibrating hopper, the feeder operating level will deliver up to 7500 pounds per hour of silica sand and similar granular materials weighing 100 pounds per cubic foot, and with the hopper up to 4500 pounds per hour. Operating downgrade the feeder delivers materially greater capacities without jeopardizing the accuracy of control. With vibrating hopper the feeder weighs 100 pounds and without 55 pounds. Pan decks are of cast aluminum, open or totally enclosed. Full load power requirement is 30 watts.

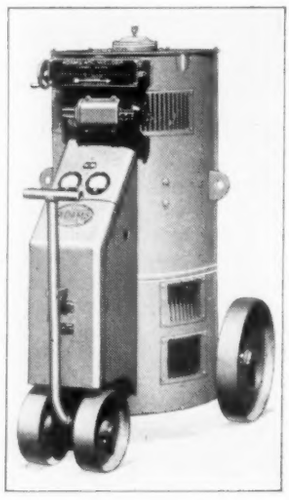


Jeffrey-Traylor electric vibrating feeder, furnished with or without vibrating hopper

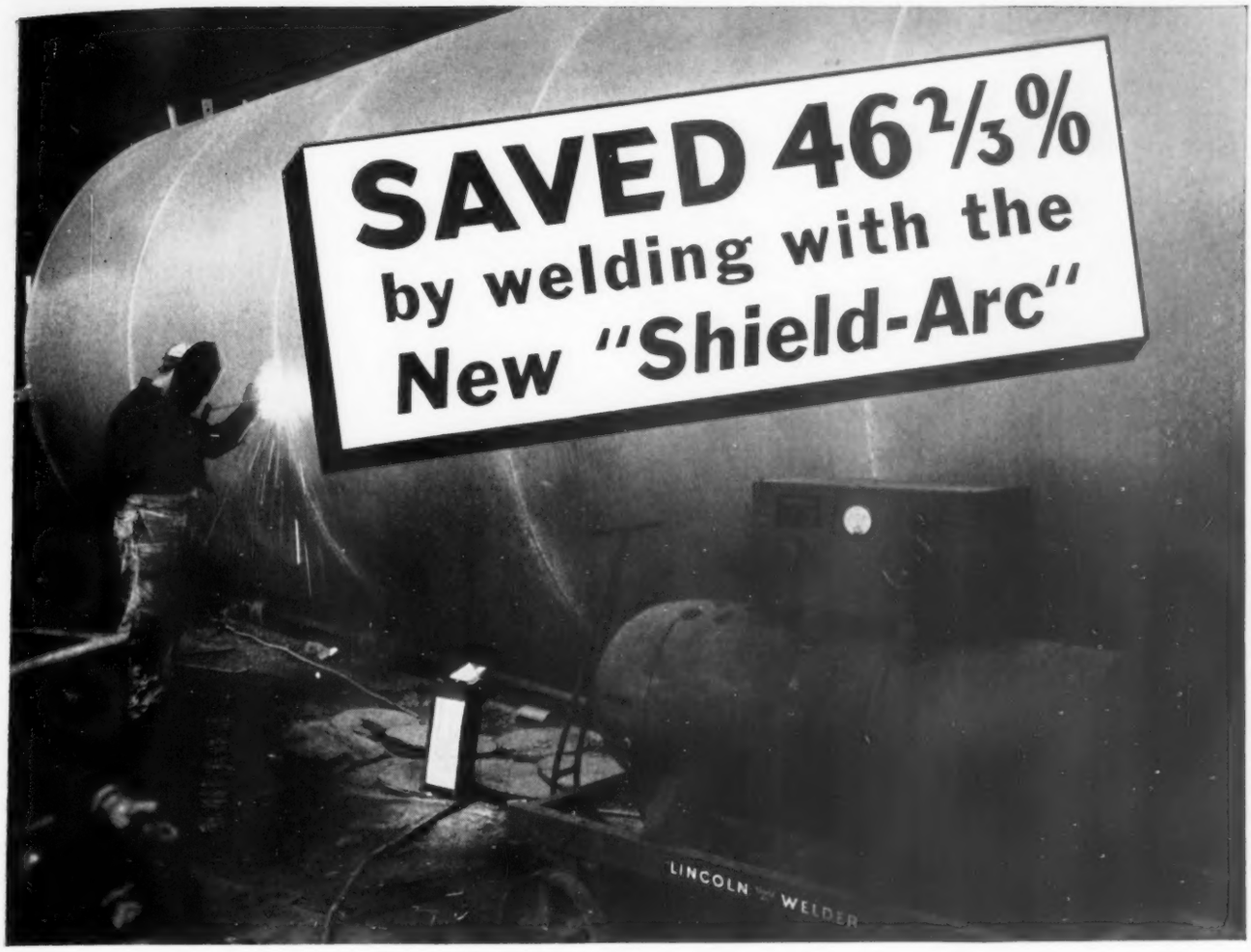
♦ ♦ ♦

Vertical Arc Welder—

J. D. Adams Co., Indianapolis, announces a new vertical, direct-current, portable arc welding unit. The vertical design, states the company, offers a number of mechanical advantages with electrical improvements. It permits low center of gravity; any wheel can be raised without tipping the machine over. The design also effects a saving in floor space. Gyroscopic stabilization of dynamically balanced rotating parts reduces vibration to a minimum. The armature shaft is mounted on an oversize angular thrust ball bearing at the top and a double-race, self-aligning radial ball bearing at the lower end. This construction is said to eliminate



Adams portable arc welder is of vertical design. It has wide welding range, from thin gages to heavy plates and structural sections

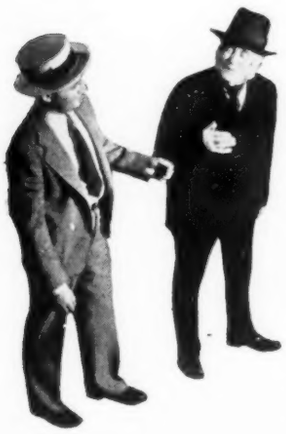


"We butt welded ⅜" plate with one of our old machines at a cost of 15c per foot. *'Shield-Arc'* did the same job and produced a better weld for only 8c per foot. *'Shield-Arc'* used 27% less electrode and was three times faster than our old machine"—thus reports one of the hundreds of companies who have found that the new Lincoln *"Shield-Arc"* soon pays for itself with the tremendous savings it makes.

Here's why the new *"Shield-Arc"* continues to pile up such amazing records:

Its high capacity allows you to use larger size electrodes and more heat. Its uniform current prevents excessive splatter. Puts more of the electrode into the weld. *"Shield-Arc's"* increased efficiency gives you more welding per kilowatt hour—or per gallon of gasoline. "Lincontrol"—the only remote control device that allows operator to regulate current without fussing with extra wires and portable rheostat—saves time and speeds up welding.

Start getting these savings now. Write for guaranteed speeds and costs. Address THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO. Largest Manufacturers of Arc Welding Equipment in the World. W-156



LAD "Television seems to be on the way all right."

POP "And I'll bet Lincoln will be the only one to use it for promoting their complete line of electrodes because each Lincoln electrode has advantages that you can really SEE."

LINCOLN
"SHIELD-ARC" WELDERS

Cadwell control contains feeder, relief and back pressure valves, ball check and screen in one complete unit

end float and minimize brush and commutator wear. The possibility of accidental reversal of polarity has been reduced. The external stabilizer has been eliminated by increasing the internal reactance of the machine. The machine is enclosed in an all-welded, drip-proof steel case. Clean air is taken in at the top, over 40 inches above the floor line, reducing the chances for picking up dirt. The new unit has a wide welding range, from thin gages to heavy plate and structural sections, without making undue demands upon the skill of the operator.

♦ ♦ ♦

Lag Screw Expansion Shield—

Diamond Expansion Bolt Co., Garwood, N. J., announces a new type lag expansion shield shown in unexpanded form in the accompanying illustration. When the hole is drilled the new shield is driven in all the way, the work to be fastened is placed in position and the lag screw turned in. It turns in freely until the head is tight up against the work. Then a few hard turns on the wrench draw one side forward over an inclined bearing, causing it to expand with a powerful wedge action. This produces a parallel expansion with full cylindrical contact from end to end, instead of an inner end contact only as formerly. The new shield is said to be equally effective with holes that are a little tight or a little large. It is made of high grade malleable iron and hot-dip galvanized.

Diamond lag screw expansion shield gives full cylindrical contact from end to end and is effective whether holes are a little small or a little large

♦ ♦ ♦

Control Unit for Hot Water Heating Systems—

Beaton & Cadwell Mfg. Co., New Britain, Conn., announces a new control unit for use with hot water heating systems. It contains feeder valve, relief valve, back pressure valve, ball check and screen in one complete unit. The type valve employed is closed by internal pressure within the system itself; it is provided with a light spring, the sole function of which is to keep the disk on the seat when there is no pressure. When there is no pressure, there is no action on the valve seats, thus eliminating sticking valves or vulcanized valve disks. The valve closes fully by a drop of about 1 pound from relief pressure.

♦ ♦ ♦

Carbon Resistor—

Ohio Carbon Co., 12508 Berea road, Lakewood, O., is manufacturing a new type of low value resistor, shown herewith, for use with electronic selective and control apparatus such as fire alarms, counting devices, etc. Values as low as 0.04-ohm, in capacities from one-quarter watt to 10 watts, are available. In producing these new low value carbon resistors, known as the "LV" series, no losses have been sustained as to their load, voltage, life, overload and humidity characteristics as compared with the company's well-known line of "Ohiohm" resistors of higher ohmic values. In fact, it is stated that extended laboratory tests show that even under humidity conditions approximating those of a tropical rainy season they will function satisfactorily.

New type of resistor for use with electronic selective and control apparatus, supplied by Ohio Carbon Co.

Balancer with tapered drum, made in capacities up to 200 pounds; product of Independent Pneumatic Tool Co.

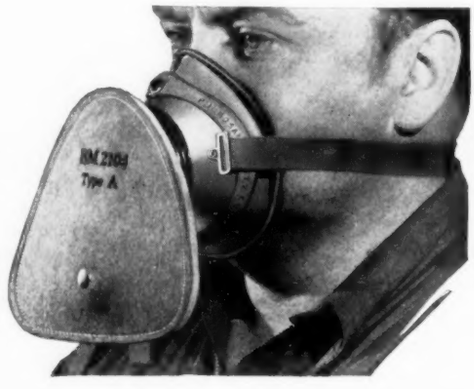
Balancers Featured by Tapered Drum—

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has introduced a line of balancers in capacities up to and including 200 pounds. A tapered drum of special design is featured throughout the entire line, and provides perfect balance of the load at any point within the range of travel. Four sizes in this line of balancers are equipped with locking and unloading devices.

♦ ♦ ♦

Respirator—

Pulmosan Safety Equipment Corp., 176 Johnson street, Brooklyn, N. Y., announces a new respirator known as M-15 and bearing the approval of the bureau of mines for Type A dusts. It is a heavy-duty unit and, as shown in the accompanying illustration, is of the pouch filter type. Its design followed exhaustive tests in fine dust in the company's laboratory. Its main body is of pressed aluminum to which is attached the company's patented noninflated cushion compounded of nonirritating, nontoxic rubber. All-rubber adjustable head bands, attached by swivel joints, allow free movement without danger of the respirator leaving the face.



Pulmosan respirator is intended for use in working atmospheres containing extremely fine dusts

New Trade Publications

Bronze Powder—O. Hommel Co., Pittsburgh. A booklet on bronze powder, its uses, manufacture and methods of application.

Steel Furniture—Angle Steel Stool Co., Plainwell, Mich. Several leaflets on angle steel chairs, stools, desks and work benches.

Compressor—Ingersoll-Rand Co., 11 Broadway, New York. A bulletin on its steam-driven air or gas compressor, type XPV, highly illustrated.

Brushes—Ohio Carbon Co., Berea road, Cleveland. A new edition of its booklet on the brush phase of motor maintenance.

Ampco Metal—Ampco Metal Inc., Milwaukee. Engineering data sheet No. 18, dealing with principal Ampco alloys.

Conduit Fittings—Veco Mfg. Co., South Norwalk, Conn. Catalog No. 6 on its aluminum conduit fittings, with illustrations and full information.

Valves—Fairbanks Co., Binghamton, N. Y. Catalog No. 21 covering its bronze and iron valves and dart unions.

Capacitors—General Electric Co., Schenectady, N. Y. Bulletin GEA 77H tells how the power factor can be improved for profit by use of its pyranol capacitors.

Industrial Mixers—Read Machinery Co. Inc., York, Pa. Bulletin on correct mixing from laboratory to industrial uses, including chemical, process, food and other uses.

Meehanite—Meehanite Metal Corp., Pittsburgh. Bulletin No. 5 by Meehanite Research institute, an interpretation of the structure of Meehanite, with photomicrographs.

Steel Buildings — Porcelain Steel Buildings Co., 555 West Goodale street, Columbus, O. A book of description and illustrations of porcelain steel modern business units.

Thermit Welding—Metal & Thermit Corp., 120 Broadway, New York. Booklet of 16 pages on Thermit welding, covering railroad, machine, marine and similar work.

Pumps—American Engineering Co., Philadelphia. A catalog of its Hele-Shaw pumps, motors and transmissions, dealing with what it calls fluid power, for many industrial applications.

Lubrication — Standard Oil Co. (Indiana), Chicago. A series of engineering bulletins for instruction of lubricating salesmen, treating in detail various phases of lubrication in industry.

Unilets — Appleton Electric Co., 1701 Wellington avenue, Chicago. Bulletin No. 802, listing unilets, portable and constant duty reelites, automobile spot lights and industrial reflectors and flood lights.

Welding Metallurgy — Linde Air Products Co., 205 East Forty-second street, New York. A booklet discussing physical and chemical principles involved in oxyacetylene welding of steel.

Furnace Brick—M. H. Detrick Co., Empire building, Pittsburgh. A booklet of text and pictures featuring Detred tread for furnace arch and wall construction.

Material Handling—Lewis-Shepard Co., 175 Walnut street, Boston. A pocket folder picturing its stackers, portable elevators, lift trucks and accessories.

Nickel Cast Iron — International Nickel Co. Inc., 67 Wall street, New York. No. 5 of section 1 of its series on cast iron data, with special reference to applications in petroleum production equipment.

Superheaters—Superheater Co., 60 East Forty-second street, New York. A leaflet celebrating its 25 years of service to American railroads in application of its superheaters to locomotives.

Transmissions — Medart Co., Potomac and DeKalb streets, St. Louis. Catalog No. 56-T, superseding No. 43, including as new material flexible pin type couplings, flexible chain couplings and other devices.

Performance—Landis Machine Co., Waynesboro, Pa. A pamphlet pointing out the better performance of newer tools compared with the old. A move to increase replacements with more efficient equipment.

Microscopy—E. Leitz Inc., 60 East Tenth street, New York. Two catalogs, No. 17 testimonials on its Ultropak microscope, and No. 18 describing the complete line of this type of microscope for industrial use.

Belt Preservatives—E. F. Houghton & Co., West Somerset street, Philadelphia. A folder of helpful information on how, when and why to use belt dressing or preservatives, with description of the Houghton dressings for various kinds of belts.

Refrigeration—York Ice Machinery Corp., York, Pa. Bulletins on new condensing units of 10, 15, 20 and 25-horsepower for commercial refrigeration and air conditioning; new, larger series of horizontal types of air conditioners for large buildings.

Lubrication — Alemite Corp., Chicago, subsidiary of Stewart-Warner Corp., 1826 Diversey parkway. A catalog of 25 pages devoted to Alemite powergun equipment, presenting, in color, equipment and accessories for all lubrication jobs, with details and specifications.

Controls—Shallcross Controls Inc., 3707 North Richards street, Milwaukee. Bulletins L-125 and L-137, the former on value of draft control and equipment for attaining it; the latter on combustion control for steam boilers.

Pumps—Worthington Pump & Machinery Corp., Harrison, N. J. Several bulletins; W-103-B1, horizontal duplex piston pumps, type PC; W-450-B22, sump pump; W-450-B17A, deep well turbine pumps; L-620-B5A, air compressor units, for oil and gas engine; starting; W-200-B2A, surface condensers; L-620-B6B, air compressor units, types VS and VA2.

Dust Exhausters — United States Hoffman Machinery Corp., 105 Fourth avenue, New York. Catalog A-182, citing dangers to health and property of accumulated dust and the means of its removal by vacuum equipment.

Special Machines Check Accuracy of Gears

(*Concluded from Page* 35)

in some cases slight, still takes place.

Almost invariably, gears swell during hardening. The two points on the teeth at which the greatest distortion takes place are in the fillet and top of the tooth. The fillet usually rises and the top of the tooth thickens.

Before the previously mentioned gear was heat treated the accumulative error was 0.001-inch. After heat treatment, this had grown to 0.003-inch, so that the tooth action was not as smooth as was the case when the gear was in the "green" condition.

By lapping this gear, using an internal gear-type lap, it was possible to bring the gear back to its original accuracy. Not only was the accuracy of the gear improved, but the tooth surfaces were considerably smoother, assuring quieter operation than with the "green" or hardened gears.

Chart Shows Process Effects

In Fig. 8 the readings of this gear in three conditions—"green," hardened and lapped—all are placed on one chart for comparison. Eccentricity is practically the same amount in the "green" and lapped gear. There is, however, some improvement in smoothness of tooth surface, and a decided improvement in all respects over the hardened gear.

Helical gears, if properly cut and mounted, show a decided improvement in action over spur gears. This is largely due to the fact that in helical gears contact is progressive across the face of the tooth and is continuously at the pitch line in some one place.

Obviously helical gears should operate more smoothly and quietly than spur gears, and as a matter of fact such is the case. Fig. 9 shows three charts of a helical gear—after cutting, hardening and lapping. Note that the lapped gear shows a considerable improvement over the hardened or the cut gear. In fact lapping has not only improved the tooth surface, but reduced the errors to about half of what they were originally in the cut gear.

SOME NOTES ON BETHLEHEM ALLOY STEELS

V-Molybdenum Steels

MOLYBDENUM imparts definite benefits to steel when subjected to heat treatment. A relatively small percentage of molybdenum exerts a profound influence in increasing the desirable properties of other alloying elements, such as manganese, nickel, and chromium, and also nickel with chromium. Molybdenum as an alloy also tends to counteract temper brittleness.

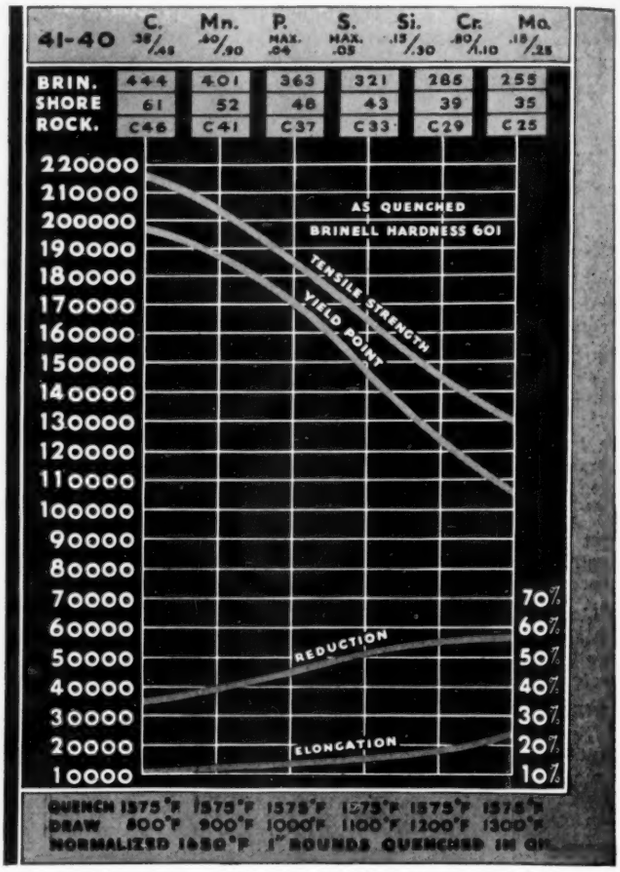
Steels containing molybdenum are classified under the S. A. E. 4xxx Series. The 41xx Series contains chromium, as well as molybdenum; the 43xx Series, both nickel and chromium. The 46xx Series contains 1.65 to 2.00 per cent nickel and the 48xx Series has a nickel content of from 3.25 to 3.75 per cent. Among all these S. A. E. Steels the molybdenum content varies from 0.15 to 0.40 per cent in 10-point ranges.

Straight molybdenum steels, which do not find as wide an application as do the steels in which molybdenum is combined with other alloys, are furnished chiefly for special uses, with carbon content varying from 0.20 to 1.00 per cent.

The 41xx chrome-molybdenum Series has a large field of usefulness, and is produced with carbon content varying from 0.25 to 0.55 per cent. This series is further divided into two general classifications: those having from 0.50 to 0.80 per cent chromium, and those containing from 0.80 to 1.10 per cent chromium. With a carbon content of from 0.25 to 0.35 per cent, the 41xx Steels are of the water-hardening type, and are used for airplane tubing, bolts, studs, axles, intake valve parts, spindles, shafts, connecting rods and similar applications. With a carbon content above 0.35 per cent, they become oil-hardening, and are used for such parts as heavy-duty gears, shafts, bolts, studs, airplane cylinders, piston rods and studs. The 41xx Series is also finding some application in high-temperature service.

The 46xx Steels, containing from 1.50 to 2.00 per cent nickel with molybdenum, are usually lower-carbon steels. They are used for carburized parts in which hard surface and high ductility in the core are demanded. 46xx Series finds its largest applications for gears of various types in the automotive field, for journals, spline shafts, king pins, pinions, roller bearings, bolts, studs, set screws, collets. The 48xx Series of molybdenum steels is similar to the 46xx carburizing steels, except for the higher nickel content. The 4640 Steel is rapidly becoming popular as an oil-hardening grade.

The combination of nickel and chromium with molybdenum in the 43xx Series produces a steel having a combination of good ductility and resistance to shock with very high strength. Although it cannot now be classed as a popular grade, it fills a very important position where a special-purpose steel is required.



★ *Physical properties of S. A. E. 41-40, a chrome-molybdenum steel producing good combinations of properties.* ★

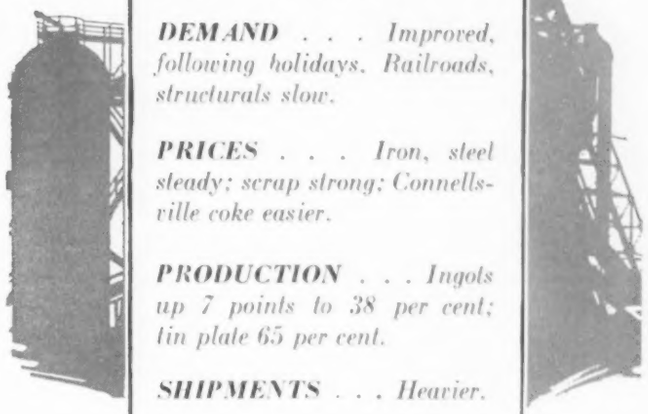
BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

Steel Rate 38, Higher Than Before Holidays

Rebound Accompanied by Strong Midseason Demand For Lighter Products



MARKET IN TABLOID

DEMAND . . . *Improved, following holidays. Railroads, structurals slow.*

PRICES . . . *Iron, steel steady; scrap strong; Connellsville coke easier.*

PRODUCTION . . . *Ingots up 7 points to 38 per cent; tin plate 65 per cent.*

SHIPMENTS . . . *Heavier.*

STEEL demand made a strong comeback last week, following Independence day, the steelworks operating rate advancing 7 points to 38 per cent, one point higher than in the closing week of June.

Underlying strength in the markets is resisting the usual seasonal influences. Automobile assemblies for the week snapped back to the early June rate of 83,000, 24,000 more than in the preceding week. Automobile manufacturers are placing moderate size orders for material for both current and fall models.

Farm implement builders are operating at 80 per cent of normal, and are planning still larger production programs for fall. Tractor manufacturers apparently will not be caught up with sales this year. Good crop prospects are a factor in sustaining farm purchasing power.

Machine tool and miscellaneous equipment sellers note a decided improvement in their orders. Retail sales of household utilities, such as washing machines and refrigerators—like those of automobiles—are going beyond makers' estimates for this season. Canmakers continue placing heavy commitments, production of which is currently at 65 per cent.

Construction industries and the railroads are giving comparatively light support to the markets at present. Structural shape awards for the week declined to 18,913 tons. The American Rolling Mill Co. placed 1900 tons for a cold-rolled strip mill building at Middletown, O. Inquiries were issued for 16,600 tons of steel for three Mississippi river dams. Considerable tonnage will be needed for repairing flood-damaged bridges and roads in southern New York. Government work under the $4,800,000,000 relief program is developing slowly, many communities to which money has been offered finding it impossible to finance purchase of materials.

New York city awarded 5000 tons of cement-lined cast pipe. Construction of 41 coast guard vessels has been recommended at Washington, which will require considerable steel.

Seaboard Air Line is in the market for 12,000 tons of rails; Nickel Plate for 4000 tons. Bids were opened last week on 6000 tons of rails and fastenings for track relocations in the Muskingum, Ohio, conservancy district. Chesapeake & Ohio awarded five locomotives, and the Canadian National is inquiring for 15. Norfolk & Southern is taking bids on 500 all-steel box cars.

Although there was not much buying in the scrap market, prices were strong, and at Cleveland advanced $1 to $2 a ton. Connellsville furnace coke was reduced 15 cents a ton, and foundry grades 50 cents, in an effort to liquidate stocks.

Steel ingot production in June—2,230,893 gross tons—was 15.3 per cent less than in May. The daily average—89,236 tons—represented a loss of 8.5 per cent. Output for six months was 16,024,691 tons, 2.3 per cent less than in the first half of 1934. The steelworks operating rate for the first half was 46.7 per cent, one point lower than last year.

STEEL's London correspondent cables that British production of ingots and castings in June—770,000 gross tons—showed a loss in the daily average of 2.5 per cent; and pig iron—529,300 tons—a loss of 2.1 per cent.

United States iron and steel exports for May totaled 286,599 gross tons, up 39.6 per cent, due mainly to a 59 per cent increase in scrap shipments to 209,424 tons.

Steelworks operations last week at Pittsburgh advanced 14 points to 34 per cent; Chicago 9½ to 42½; eastern Pennsylvania 5½ to 26½; Wheeling 22 to 62; Cleveland 28 to 44; Youngstown 17 to 43; Detroit 16 to 94. New England declined 15 to 41; Buffalo 3 to 26, while Birmingham was unchanged at 30.

STEEL's iron and steel price composite is up 1 cent to $32.40; the finished steel composite remains $54, and the scrap index $10.34.

COMPOSITE MARKET AVERAGES

	July 13	July 6	June 29	One Month Ago June, 1935	Three Months Ago April, 1935	One Year Ago July, 1934	Five Years Ago July, 1930
Iron and Steel	$32.40	$32.39	$32.39	$32.42	$32.29	$32.32	$33.00
Finished Steel	54.00	54.00	54.00	54.00	54.00	54.05	51.90
Steelworks Scrap	10.34	10.34	10.34	10.45	10.75	10.30	12.58

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 13, 1935	June, 1935	April, 1935	July, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.80c
Steel bars, Chicago	1.85	1.85	1.85	1.85
Steel bars, Philadelphia	2.11	2.11	2.09	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.00½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.98½	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.45
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.40
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.40
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.40
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	July 13, 1935	June, 1935	April, 1935	July, 1934
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.76	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.26	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.15	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	89.85	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.63	18.88

Scrap

Heavy melting steel, Pittsburgh	$12.00	$12.25	$11.70	$12.00
Heavy melt. steel, No. 2, east. Pa.	9.50	9.30	9.15	8.90
Heavy melting steel, Chicago	10.00	10.25	10.05	9.55
Rails for rolling, Chicago	10.75	11.25	11.05	10.85
Railroad steel specialties, Chicago	11.75	11.75	11.25	10.50

Coke

Connellsville, furnace, ovens	$3.25	$3.50	$3.60	$3.60
Connellsville, foundry, ovens	4.00	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.....0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr.....0.45
5100 Cr. spring.....base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250.....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23¾-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70 off

Hexagon Cap Screws

Milled	85-10 off
Upset, 1-in., smaller	87½ off

Square Head Set Screws

Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

*Connellsville, fur.	$3.25- 3.40
*Connellsville, fdry.	4.00- 4.10
*Connel. prem. fdry.	5.00- 5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

Tank lots	Spot
Pure and 90% benzol	15.00c
Toluol	30.00c
Solvent naphtha	30.00c
Commercial xylol	30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm..	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O..	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem..	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $55.00

First Quality.

*Pa., Ill., Md., Mo. .. $45.00
*Alabama, Ga., Ky., $40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo. 40.00
Ga., Ala. 35.00

Ohio

First quality $40.00
Intermediary 37.00
Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00
Joliet, E. Chicago 54.00
Birmingham, Ala. 52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).... $45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).. 40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk).. 22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00
Chemically bonded chrome brick 45.00
Magnesite brick 65.00
Chemically bonded magnesite brick 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads $13.00-14.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid 85.00
Do., Balti. base 85.00
Do., del. Pittsburgh 90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot† 26.00
Do., New Orleans 26.00
Ferrosilicon, 50% freight all., cl. 77.50
Do., less carload .. 85.00
Do., 75 per cent .. 126-130.00
Spot, $5 a ton higher.
Silicomang., 2½ carb. 90.00
2% carbon, 95.00; 1%, 105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. .. 10.00
Ferrotungsten, stand., lb. cont. del. 1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont. 2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton 137.50
Spot, 1 ton, frt. allow., lb. 7.00
do., under 1 ton..... 7.50
Ferrophosphorus, per ton, c. l., 17,-19% Rockdale, Tenn., basis, 18%, $2 unitage 50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage 65.00
Ferromolybdenum, stand. 55-65%, lb. 0.95
Molybdate, lb. cont. 0.80
†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
July 6	8.00	8.12½	7.50	51.90	50.90	4.05	3.90	4.30	*19.00	12.75	35.00
July 8	8.00	8.12½	7.50	52.20	51.17½	4.10	3.95	4.30	*19.00	12.75	35.00
July 9	7.75	8.12½	7.50	52.15	51.20	4.15	4.00	4.30	*19.00	12.75	35.00
July 10	8.00	8.12½	7.50	52.15	51.05	4.15	4.00	4.30	*19.00	12.75	35.00
July 11	8.00	8.12½	7.50	52.15	50.95	4.15	4.00	4.30	*19.00	12.75	35.00
July 12	8.00	8.12½	7.50	52.00	50.90	4.15	4.00	4.30	*19.00	12.75	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c *Conn. copper.*

Sheets

Yellow brass (high) 13.62½
Copper, hot rolled.. 15.00
Lead, cut to jobbers 7.75
Zinc, 100-lb. base..... 9.50

Tubes

High yellow brass 15.37½
Seamless copper..... 15.25

Rods

High yellow brass 12.12½
Copper, hot rolled.... 12.25

Anodes

Copper untrimmed.. 12.75

Wire

Yellow brass (high) 14.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York 4.25- 4.50
Cleveland 4.25- 4.75
Chicago 4.25- 4.50
*St. Louis 4.25- 4.50

Heavy Copper and Wire

New York, No. 1..... 5.50- 5.75
Chicago, No. 1 ..... 5.25- 5.50
Cleveland 4.75- 5.00
St. Louis, No. 1..... 5.50- 5.75

Composition Brass Borings

New York 3.87½-4.12½

Light Copper

New York 4.25- 4.50
Chicago 3.75- 4.00
*Cleveland 3.75- 4.25
St. Louis 4.50- 4.75

Light Brass

Chicago 2.00- 2.25
*Cleveland 2.00- 2.50
St. Louis 2.25- 2.50

Lead

*New York 3.12½- 3.25
*Cleveland 3.00- 3.12½
Chicago 2.75- 3.00
St. Louis 3.00- 3.25

Zinc

New York 2.00- 2.25
Cleveland 2.00- 2.25
St. Louis 2.50- 2.65

Aluminum

Borings, Cleveland 7.50- 8.00
Mixed, cast, Cleve.... 12.00-12.50
Mixed, cast, St. L... 11.75-12.00
Clips, soft, Cleve.... 13.50-14.00

SECONDARY METALS

Brass ingott, 85-5-5-5 8.00
Stand. No. 12 alum. 16.00-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt...	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	10.50-11.00
Buffalo, No. 2	9.25- 9.75
Chicago, No. 1	9.75-10.25
Cleveland, No. 1	10.50-11.00
Cleveland, No. 2	10.00-10.50
Detroit, No. 1	8.25- 8.75
Detroit, No. 2	7.25- 7.75
Eastern Pa., No. 1..	10.00-10.50
Eastern Pa., No. 2..	9.50
Federal, Ill.	7.75- 8.75
Granite City, R. R.	7.75- 8.25
Granite City, No. 2..	6.75- 7.25
N. Y., deal, No. 2....	7.50
N. Y., deal. barge....	8.50
Pittsburgh, No. 1....	11.75-12.25
Pittsburgh, No. 2....	10.25-10.75
St. Louis	7.50- 8.00
Valleys, No. 1	11.50-12.00

COMPRESSED SHEETS

Buffalo, dealers	9.25- 9.75
Chicago, factory	8.50- 9.00
Chicago, dealer	7.50- 8.00
Cleveland	10.00-10.50
Detroit	8.50- 9.00
E. Pa., new mat.	10.00
Pittsburgh	11.75-12.25
St. Louis	6.25- 6.75
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo	7.00- 7.50
Cincinnati, del.	6.00- 6.50
Cleveland	8.00- 8.50
Pittsburgh	10.25-10.75
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	6.00- 6.50
Cincinnati	5.50- 6.00
Detroit	5.00- 5.50
St. Louis	4.25- 4.75

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	13.00-13.50
Chicago (3 ft.)	12.50-13.00
Chicago (2 ft.)	13.00-13.50
Cincinnati, del.	11.00-11.50
Detroit	10.50-11.00
Pitts., open-hearth, 3 ft. and less	14.00-14.50
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.50- 8.00
Chicago	9.75-10.25
Pittsburgh	13.00-13.50
St. Louis	9.75-10.25

STOVE PLATE

Birmingham	5.75- 6.00
Boston, dealers	3.50- 3.75
Buffalo	9.25- 9.75
Chicago, net	6.00- 6.50
Cincinnati, dealers..	5.50- 6.00
Detroit, net	5.75- 6.25
Eastern Pa.	8.50
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	11.50-12.00
Eastern Pa.	13.50
Pittsburgh	14.50-15.00
St. Louis	9.75-10.25

ANGLE BARS—STEEL

Chicago	12.00-12.50
St. Louis	9.50-10.00

RAILROAD SPECIALTIES

Chicago	11.50-12.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.75-13.25
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops..	13.00-14.00
Pittsburgh, billet, bloom crops	15.00-15.50
Pittsburgh, sheet bar crops	13.50-14.00

FROGS, SWITCHES

Chicago	10.00-10.50
St. Louis, cut	9.75-10.25

SHOVELING STEEL

Chicago	9.75-10.25
Federal, Ill.	7.75- 8.25
Granite City, Ill.	6.75- 7.25

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.25- 9.75
Buffalo, No. 2	10.75-11.25
Chicago, No. 1, net..	8.50- 9.00
Chicago, No. 2	9.75-10.25
Cincinnati, No. 2	7.50- 8.00
Eastern Pa.	10.50-11.00
N. Y., No. 1, deal....	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	7.75- 8.25

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers..	3.50- 4.00

BUSHELING

Buffalo, No. 1	9.25- 9.75
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal....	6.00- 6.50
Cincinnati, No. 2....	3.00- 3.50
Cleveland, No. 2	7.00- 7.50
Detroit, No. 1, new..	7.00- 7.50
Valleys, new, No. 1	10.50-11.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	1.75- 2.00
Buffalo	4.50- 5.00
Chicago	5.00- 5.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	6.25- 6.75
Detroit	4.25- 4.75
Eastern Pa.	6.00- 6.50
New York, dealers..	2.00- 2.25
Pittsburgh	8.00- 8.50
St. Louis	2.25- 2.75
Valleys	8.25- 8.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Cincinnati, dealers..	3.50- 4.00
Cleveland	7.00- 7.50
Detroit	4.75- 5.25
Eastern Pa.	5.00
New York, dealers..	1.50- 1.75
Pittsburgh	6.50- 7.00

CAST IRON BORINGS

Birmingham, plain..	3.50- 4.00
Boston, chemical....	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	6.50- 7.00
Chicago	5.00- 5.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	7.00- 7.50
Detroit	4.75- 5.25
E. Pa., chemical....	11.00-12.00
New York, dealers..	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers..	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.50- 8.00
Chicago, net	6.00- 6.50
Cincinnati	4.00- 4.50
Eastern Pa.	8.50
New York, dealers..	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.50
Buffalo	9.25- 9.75
Cleveland	8.00- 8.50
Detroit	7.00- 7.50
Pittsburgh	10.00-10.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	10.50-11.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur....	9.50-10.00
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point..	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	12.50-13.00
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point..	12.00-12.25
Eastern Pa.	17.50
New York, dealers..	13.00-13.25
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal....	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.75-13.25
Chicago, iron	10.00-10.50
Chicago, rolled steel	10.75-11.25
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron....	11.00
Eastern Pa., steel....	13.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	14.50-15.00
St. Louis, iron	8.00- 8.50
St. Louis, steel	10.75-11.25

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.75-11.25
Buffalo, mach.	11.50-12.00
Chicago, agri. net....	7.50- 8.00
Chicago, auto	9.00- 9.50
Chicago, mach. net	9.00- 9.50
Chicago, railr'd net	8.00- 8.50
Cinci., mach. cup....	8.50- 9.00
Cleveland, cupola....	11.50-12.00
Detroit, net	10.00-10.50
Eastern Pa., cupola	11.00-12.00
E. Pa.,mixed yard..	8.50- 9.50
Pittsburgh, cupola..	13.50-14.00
San Francisco, del..	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach..	9.00- 9.50

HEAVY CAST

Boston, del.	5.25- 5.50
Buffalo, break.	8.50- 9.00
Cleveland, break.	7.50- 8.00
Detroit, No. 1, mach. net.	10.00-10.50
Detroit, break.	8.00- 8.50
Detroit, auto net....	10.50-11.00
Eastern Pa.	10.50-11.00
N. Y., break. deal....	6.25- 6.50
Pittsburgh	11.50-12.00

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.00-13.50
Chicago, R. R.	13.00-13.50
Cincinnati, agri. del.	8.50- 9.00
Cleveland, rail	14.50-15.00
Detroit, auto	10.00-10.50
St. Louis, R. R.	10.75-11.25
Eastern Pa., R. R.,...	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	10.50-11.00
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	11.50-12.00
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.50-13.00
Chicago	12.00-12.50
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	13.50-14.00
Pittsburgh (light)	13.00-13.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos....	10.00
Swedish basic, 65%	9.00
Swedish low phos...	10.00
Spanish No. Africa basic, 50 to 60%....	9.00
*Tungsten, spot, sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%.....	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%..	26.00
So. African, 52%.....	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

	STEEL BARS	IRON BARS	REINFORCING BARS
Baltimore*	2.95c	3.40c	2.60c
Boston††	3.00c	3.31c	3.31c
Buffalo	3.00c	3.05c	2.75c
Chattanooga	3.31c	3.17c	3.36c
Chicago	2.95c	2.93c	3.19c
Cincinnati	3.17c	3.25c	2.10c-2.60c
Cleveland	2.95c		
Detroit	3.04c		
Houston	3.00c		
Los Angeles	3.60c		
Milwaukee	3.06c		
New Orleans	3.30c		
New York‡(d)	3.26c		
Pittsburgh (h)	2.90c		
Philadelphia*	2.93c		
San Francisco	3.60c		
Seattle	3.60c		
St. Louis	3.19c		
St. Paul	3.00c		
Tulsa	3.25c		

	SHAPES	PLATES	NO. 10 BLUE
Baltimore*	3.00c	3.00c	3.10c
Boston††	3.19c	3.21c	3.30c
Buffalo	3.25c	3.37c	3.62c
Chattanooga	3.56c	3.56c	3.36c
Chicago	3.20c	3.20c	3.05c
Cincinnati	3.42c	3.42c	3.22c
Cleveland	3.31c	3.31c	3.11c
Detroit	3.42c	3.42c	3.14c
Houston	3.00c	3.00c	3.35c
Los Angeles	3.60c	3.60c	3.70c
Milwaukee	3.31c	3.31c	3.16c
New Orleans	3.55c	3.55c	3.55c
New York(d)	3.37c	3.40c	3.31c
Philadelphia*	2.98c	2.98c	3.75c
Pittsburgh(h)	3.15c	3.15c	2.95c
Portland	3.55c	3.55c	3.75c
San Francisco	3.55c	3.55c	3.75c
Seattle	3.55c	3.55c	3.75c
St. Louis	3.44c	3.44c	3.29c
St. Paul	3.25c	3.25c	3.45c
Tulsa	3.50c	3.50c	3.70c

	Cleveland (c)	2.10c
	Cincinnati	3.25c
	Houston	3.25c
	Los Ang., cl.	2.45c
	New Orleans	3.50c
	Pitts., plain (h)	3.05c
	Pitts., twisted squares (h)	3.175c
	San Francisco	2.45c
	Seattle	2.45c
	St. Louis	3.24c
	Tulsa	3.25c
	Young.	2.30c-2.60c

	NO. 24 BLACK	NO. 24 GALV. SHEETS	BANDS	HOOPS
Baltimore*	3.60c	4.30c	3.20c	2.30c
Boston (g)	3.95c	4.00c	3.30c	4.30c
Buffalo	3.25c	4.65c	3.42c	3.42c
Chattanooga	4.21c	4.86c	3.61c	3.30c
Chicago	3.85c	4.55c	3.30c	3.47c
Cincinnati	4.07c	4.72c	3.47c	3.39c
Cleveland	3.91c	4.61c	3.36c	5.85c
Detroit	3.94c	4.72c	3.39c	3.41c
Los Angeles	4.35c	4.40c	3.25c	3.56c
Milwaukee	3.96c	4.95c	4.10c	3.43c
New York	3.89c	4.66c	3.41c	
Philadelphia*†	3.60c	4.50c	3.95c	
Pitts.** (h)	3.55c	4.50c	3.56c	
Portland	4.40c	4.30c	3.18c	
San Francisco	4.40c	4.15-4.45c	3.20c	
Seattle	4.40c	5.00c	4.25c	
St. Louis	4.09c	5.00c	4.25c	
St. Paul	3.695c	5.00c	4.25c	
Tulsa	4.75c	4.79c	3.54c	
		4.19c	3.20c	
		5.10c	3.45c	

	COLD FIN. STEEL	COLD ROLLED STRIP	TOOL STEELS (Applying on or east of Mississippi river; west of Mississippi 1c up)
Baltimore (c)	3.58c	Boston, 0.100-in., 500 lb. lots 5.35c	Base
Boston	3.75c-3.90c	Buffalo 3.39c	High speed 57c
Buffalo (h)	3.40c	Chicago 3.27c	High carbon, high chrome 37c
Chattanooga*	3.98c	Cincinnati (b) 3.44c	Oil hardening 22c
Chicago (h)	3.35c	Cleveland (b) 3.20c	Special tool 20c
Cincinnati	3.57c	Detroit 3.33c	Extra tool 17c
Cleveland (h)	3.35c	New York 3.36c	Regular tool 14c
Detroit	3.49c	St. Louis 3.36c	Uniform extras apply
Los Ang.(f) (d)	5.85c		
Milwaukee	3.46c		
New Orleans	4.15c		
New York	3.81c-4.31c		
Philadelphia	3.61c		
Pittsburgh	3.20c		
Portland (f) (d)	6.00c		
San Fran.(f) (d)	5.95c		
Seattle (f) (d)	6.00c		
St. Louis	3.59c		
St. Paul	3.05c		
Tulsa	4.50c		

	BOLTS AND NUTS (100 pounds or over) Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, July 11

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.50 3 2 6	$13.76	1 14 0
Basic bessemer	15.50 3 2 6*	12.95	1 12 0
Hematite, Phos. .03-.05	15.62 3 3 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27.28 5 10 0	$19.02	2 7 0
Wire rods, No. 5 gage	42.16 8 10 0	36.44	4 10 0
FINISHED STEEL			
Standard rails	$38.44 7 15 0	$44.53	5 10 0
Merchant bars	1.66c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.63c 7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.77c 8 0 0	1.51c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2.13c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c 11 5 0	3.21c	8 15 0
Bands and strips	1.88c 8 10 0	1.46c	4 0 0
Plain wire, base	2.04c 9 5 0	1.96c	5 7 6
Galvanized wire, base	2.38c 10 15 0	2.29c to 2.35c	6 5 6 to 6 7 6
Wire nails, base	2.65c 12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$4.46 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Sdy. pig iron, Si. 2.5	$16.74 3 7 6(a)	$17.24	260	$12.51	370	$25.44 63
Basic bessemer pig iron	17.36 3 10 0(a)*	12.27	185	11.15	330	28.06 (b)69.50
Furnace coke	4.09 0 16 6	7.96	120	3.72	110	7.67 19
Billets	27.28 5 10 0	28.51	430	18.25	540	38.97 96.50
Standard rails	1.82c 8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.90c 8 12 0	1.68c	560	.90c	600	2.01c 110
Structural shapes	1.93c 8 15 0	1.65c	550	.90c	600	1.97c 107.50
Plates, †¼-in. or 5 mm.	2.00c 9 1 3	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.32c 10 10 0§	1.86c	620‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.87c 13 0 0	3.81c	1,270	2.25c	1,500	6.77c 370
Plain wire	2.04c 9 5 0	3.39c	1,130	1.73c	1,150	3.17c 173
Bands and strips	2.07c 9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 66.22 per cent over paper sterling.

Bars

Bar Prices, Page 70

Pittsburgh — Merchant steel bar specifications have increased and while buying is mainly miscellaneous there are high hopes of steady improvement over the balance of the year. Among prominent bar buyers are agricultural implement manufacturers, who have ambitious fall schedules, automotive trade with introduction of 1936 models planned earlier this year, and concrete bar reinforcing division. Merchant steel bars at 1.80c, base, Pittsburgh, are firm; likewise the alloy bar market, quoted 2.45c, base, Pittsburgh.

Cleveland—Steel bar mill operations here resumed last week at one-third of capacity, about 10 points less than in the final week of June, following suspension part of the week of Independence day. Business is of a more miscellaneous character. Automobile manufacturers are placing small fill-in requirements for present models, while some small orders have been received from Nash and Buick for new models. Specifications from builders of road machinery are fairly good, and railroads are purchasing little material.

Chicago—Steel bar demand is better than anticipated, a steady flow being received from a variety of miscellaneous consumers, while orders from farm implement and automotive industries are steady. Tractor manufacturers continue behind on orders and production of other equipment so far has failed to show its usual summer slackening. Prices continue firm.

Boston—Demand for commercial steel, alloy and forging bars is slightly heavier. Consumers, however, are buying close to needs and some larger users, notably the railroads, are taking light shipments. Industrial demand is better in spots with indications of substantially heavier purchasing by machine tool builders. Miscellaneous inquiry holds to the current rate. Prices are unchanged.

New York—Commercial steel bar prices are holding and there is a fair sprinkling of miscellaneous orders. Bolt and nut manufacturers, one of the principal consuming groups here, are specifying a little more freely, as stocks are beginning to need replenishing.

Foreign competition in steel bars is becoming increasingly pronounced.

Philadelphia — Commercial steel bar tonnage is moving slowly. Machine tool and agricultural equipment manufacturers are taking fair quantities of cold-finished bars, but cold finishers have pretty fair stocks and are issuing replacement releases slowly. Commercial steel bars are unchanged at 1.80c, Pittsburgh, or 2.11c, Philadelphia.

Plates

Plate Prices, Page 70

Philadelphia—District plate makers are still awaiting distribution of steel for the Chesapeake & Ohio and New York board of transportation car orders, recently noted, also for the 500 all-steel box cars for the Norfolk Southern, on which car builders are now being asked to submit bids. Reports that this work would be done in the Norfolk Southern's own shops are in error, as the company's facilities are said to be inadequate.

While no steel estimates are available, the advisory committee on allotments for public works in Washington has recommended the construction of 41 craft for the United States coast guard, a number of which are large enough to incite speculation of steelmakers. Of the larger size are 11 patrol boats of

"A.W."
SUPER-
DIAMOND
for Permanence and Economy
"Battle decks" for Bridges—the daily grind and pound of traffic can proceed promptly, safely and "permanently" over "AW" Super-Diamond Floor Plates.
More and more engineers are realizing the value of this floor plate on new construction (and the replacement of old decks) because it saves wear and tear—and taxes.
Also made in the reliable Standard Diamond and Diamondette patterns in ferrous or non-ferrous metals.
SLIP-PROOF • OIL-PROOF
HEAT-PROOF • CRACK-PROOF • SAFE • SIGHTLY
SELF-DRAINING
SPLINTERLESS
ALAN WOOD STEEL CO.
ESTABLISHED
TRADE "A.W." MARK
1826
CONSHOHOCKEN, PA.
109 Years' Iron and Steel Making Experience
ALAN WOOD
STEEL COMPANY
CONSHOHOCKEN, PA.
Branch Offices: Philadelphia • New York • Seattle
Los Angeles • San Francisco • Memphis • Boston

which seven will be 80 feet in length and four 65 feet. There will also be two so-called harbor craft, each 65 feet in length and five boats of another type 50 feet in length. The remainder range from 26 to 35 feet in length. Plates are unchanged at 1.90c, Coatesville, or 1.995, Philadelphia.

Pittsburgh—Bids have been received by the Mississippi Valley Barge Lines Co., St. Louis, on 30 steel barges, according to two alternate designs. Award will not be made at once as there is a possibility that if financing is worked out that the order will be increased to 40 barges. American Oil Co., Baltimore, closes bids July 15 on one to four steel barges for service in the Pittsburgh district. The most promising plate market inquiry on which mills in this district are figuring is the Chesapeake & Ohio freight car order, a major part of which is to be constructed by car shops in the Pittsburgh district. Plates are firm at 1.80c, base, Pittsburgh.

Cleveland—Carload orders for plates are more numerous, but large tonnage requirements are lacking. Tank fabricators are supplying a relatively high proportion of the total tonnage. Prices are firm.

Chicago—A few small tank orders have been placed and a moderate tonnage of plates is involved in pending industrial tank work. Heavier plate orders are in prospect for railroad equipment building and repairs, with additional lots to be required for Mississippi river lock construction. Business from miscellaneous sources is fairly steady, though relatively light.

Boston — Shipyard requirements are well sustained, part of the buying being done by the navy direct. Total volume is up slightly, due largely to a somewhat better miscellaneous small-lot demand. Prices are holding.

New York—Miscellaneous plate demand is somewhat improved and one large seller reports sales this month in excess of the same period in June. Tidewater Oil Co., New York, is inquiring for about 250 tons of plates for oil terminals at Bangor, Me., and Pittsford, N. Y.

San Francisco — Little of importance is pending in the plate market on the Pacific Coast. The only award went to unnamed interests and involved 100 tons for tunnel lining for Los Angeles.

Contracts Placed

910 tons, steel tunnel lining, New York approach to Hudson river tunnel, Manhattan-Weehawken, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.; Cornell Contracting Corp., New York, general contractor.

300 tons, two 132 x 35 x 8-foot steel tank

A large tonnage order received by an Indiana steel plant demanded urgent delivery on a 15-ton crane with 100-foot span for continuous strip mill operation. Every day without it meant increased production costs.

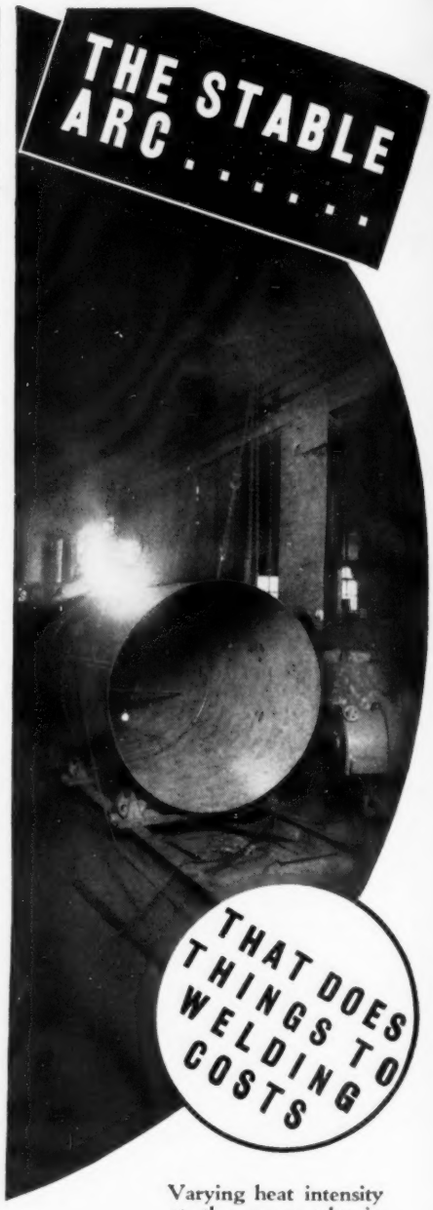
P&H engineers designed it . . . P&H shops built it . . . it was shipped 18 days from the day the order was taken.

Without such advanced production equipment, delivery could not have been made in double the time. As America's foremost builder of overhead traveling cranes, Harnischfeger offers you experience, cooperation and every facility to meet your problems — use this service.

Write for catalog 450

HARNISCHFEGER CORPORATION
4411 W. National Ave., Milwaukee, Wis.

P&H TRAVELING CRANES



Varying heat intensity at the arc results in uneven penetration, fusion and strength of welds. Welding is faster, easier, better when current uniformity is inherent. And it's done more economically, too.

P&H-Hansen's extremely uniform arc, as shown by the oscillograph record, is "built in" with an exclusive internal stabilizer winding that does away with exterior gadgets. Every gradation in current is obtained on the P&H-Hansen through the use of one simple micrometer screw. The proper setting is quickly accomplished over the entire welding range.

Ask for the complete story in Bulletin "Weld It Well."

HARNISCHFEGER CORPORATION
4411 W. National Ave., Milwaukee, Wis.

P&H HANSEN ARC WELDERS

barges for Gulf Refining Co., Pittsburgh, awarded through the latter's New York marine department headquarters to Nashville Bridge Co., Nashville, Tenn.

210 tons, gas holder, Coney Island, Brooklyn, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

125 tons, tanks, Princeton, Ill. to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons, tunnel lining, specification 1712, Los Angeles, to unnamed interest.

Contracts Pending

228 tons, 20-inch steel pipe, for United States engineer, Philadelphia, for Fort Mifflin, Pa., Lancaster Iron Works, Lancaster, Pa., low.

200 tons, three scows, United States engineer, Philadelphia, for Chesapeake City, Md., Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., reported low.

Sheets

Sheet Prices, Page 70

Cleveland—The sheet market is quieter, but less so than expected. Automobile specifications so far this month are about 50 per cent of the June average, while shipments to makers of household utilities are approximately 75 per cent of those last month. The Cleveland sheet mill operated at 45 per cent last week, and the mills at Monroe, Mich., started up Wednesday with a schedule to Saturday. Nash, Buick, Chrysler, Hupp, Hudson and LaSalle have made moderate purchases for new models, while Chevrolet continues to place orders for current models. Sheets specified for the new models generally are of the same thickness and length, but some are for widths 5 inches less than formerly, these being for hoods. Nash and Buick, apparently, will be the first with fall assemblies. Retail sales of refrigerators and washing machines, like those of automobiles, are going beyond makers' estimates for this season. Sheet prices are steady.

Pittsburgh—On more numerous carload orders for sheets, which buyers placed last week, a full schedule of base prices continued, namely 1.85c, Pittsburgh, on hot-rolled No. 10; 2.40c for hot-rolled annealed, 24 gage; 2.50c on No. 10 gage cold rolled; and 2.95c on No. 20 cold rolled. In spite of the fact that a few automobile manufacturers are feeling out the market on attractive inquiries for shipment over the balance of the third quarter, no price weakness has been recorded. The miscellaneous character of sheet buying still is a market feature.

Chicago — Sheet demand has recovered moderately since the holiday week, with fair demand continuing from the automotive industry and other important consumers. Stocks of users remain light and though orders frequently are small, the total volume is well maintained. Roofing material is slightly more active. Sheet prices are steady.

Boston—Sheet buying has improved little since the quarter opened. The number of shipments released are fairly numerous and frequent, but total tonnage is not large. Jobbers are buying cautiously, and instances are reported of a more unsettled market on sheets among warehouses in some sections of the district. Mill prices are firm.

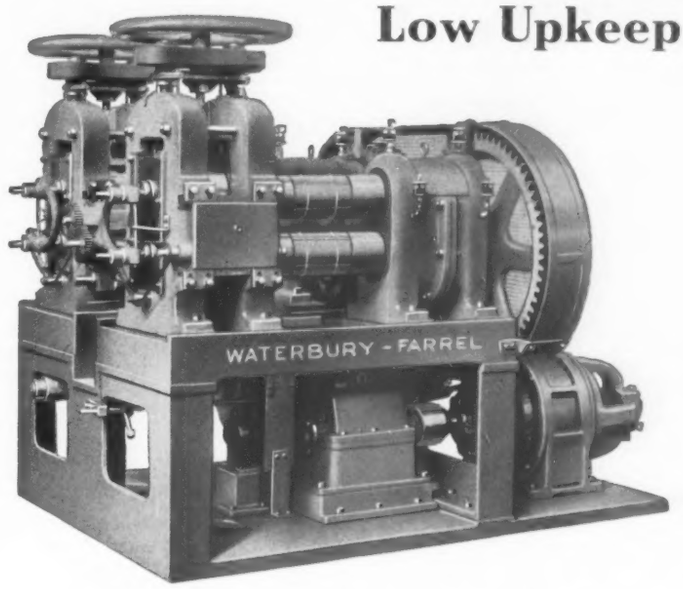
New York—Sheet business is better than expected, although reflecting mid-year influences. Manufacturers of electrical refrigerators in this district are virtually out of the market. Apollo Steel Co., Apollo, Pa., has been awarded 500 tons of No. 24 gage sheets for New York state license tags, for full delivery by Sept. 30.

Philadelphia — Recent flood disturbances in eastern Pennsylvania have resulted in demands for galvanized sheets. Otherwise the situation is much unchanged, with sellers looking for little general improve-

Wire Flattening Mills

Another Waterbury Farrel Product Which Insures

Savings
Dependability
Low Upkeep



10″ TANDEM WIRE FLATTENING MILL

The Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut

OFFICES

CLEVELAND CHICAGO PHILADELPHIA

ment over the next few weeks. Prices are unchanged.

Buffalo—Buffalo sheet mills last week resumed operations at 50 per cent. Producers believe late summer will bring an improvement in demand.

Cincinnati — Purchasing by one manufacturer of low-price automobiles, combined with a good demand from jobbing interests, has sustained mill operations at about 45 per cent.

St. Louis—Orders since July 1 have diminished in volume. Miscellaneous needs account for the major part of current tonnages. Demand from railroad car builders is quiet, but slight improvement is noted in the outlet through the petroleum industry.

Birmingham, Ala.—Operation at sheet mills in this district are fairly steady, although the outlook for July is not so promising.

Quicksilver

New York—Quicksilver prices on small lots are unchanged, with lots of 15 to 24 flasks inclusive $72.50, a flask, and single flasks up to $73.50. Moderate business has been done in small lots. Inquiries have developed for large lots and prices are easier, with 100 flasks or more now $70.50, down 50 cents.

Behind the Scenes with STEEL

U. S.—Spendthrift

WHILE reading an interesting article in a national weekly recently we came across this rather startling comparison:

From 1789 up to 1913 the United States spent, all told, $24,521,845,000. That covers the period between Washington's and Wilson's inaugurations. In the fiscal years 1934, 1935 and 1936 actual and estimated expenditures will total $24,206,533,000. Roosevelt dollars or pieces of eight, that's a whale of a lot of money.

We borrowed the engineering editor's slide rule and after many hours work find the government is spending at the rate of $15,350 a minute! The average

cost for every man, woman and child for each of these three years will be about $63. And since we are lucky (?) enough to be among the working population the actual amount will be several times that.

Wonder what chance our grandchildren will have of ever getting even with the books?

* * *

Legislative Label

WE LIKE people that come right out and say what they think. For that reason we're sure we'd like R. E. Crane, president of the Eljer Co. After reading "Mirrors of Motordom" in the July 1 issue he got right to work and wrote us suggesting we send a marked copy of the article to each of our legislators. He says:

"Any such wholesale destruction of industry as is disclosed in this plan certainly must be apparent to even the dumbest of our legislators."

Incidentally, if you didn't read the article you'd best dig up the issue and do so. It is an analysis of the effect the proposed tax program would have upon such large enterprises as the Ford Motor Co. (Page 18, July 1 issue.)

* * *

Booster No. 49,691

AND then right on top of Mr. Crane's word of advice came a nice pat on the back from O. W. Irwin, Carnegie Steel's manager of the concrete bar bureau. He spurs us on with these kind words:

"You may not know it but I am quite a booster for your magazine. I think it is the most up-to-date one of its kind in its field. Here's wishing you and your organization continued success as you present your delightful production week by week."

Thanks very much, Mr. Irwin. We couldn't have said it better ourselves.

* * *

Opportunity Knocks

THESE Cuban revolutionists may be planning a more modern uprising next time. At least that impression can be had from a letter we just received from a Senor in Havana.

He wants us to advise him of a manufacturer of barbed wire interested in the Cuban market. Barbed wire pays no duty in Cuba, he tells us, and "therefore it offer an excellent opportunity."

Well, we gave him what he wanted but when the shootin' begins we're going to be a long way off.

* * *

Half-Baked

PICTURES of cool summer paradises by shimmering lakes in the north countree only emphasize the effects of a broiling July sun as it pours in our office with a delightful western exposure. Copy paper curls up, turns brown and disintegrates. Varnish on the desk blisters, crackles and wearily drops to the floor. We fried an egg in a stainless steel ashtray this afternoon. Carrier me back to old Virginny!

* * *

Keokuk Kontest Kut-Up

BEST entry so far in the $5.00 prize contest for interpreting our signature—SHRDLU—comes from Ralph C. Hirsch, American Cement Machine Co., Keokuk, Iowa. He sends in five and says he believes the last one listed is worth a couple of cases of beer. Unfortunately, Mr. Hirsch, we'll drink the beer ourselves but you do have a toehold on the five bucks. Here are three of his brainchildren:

Steel Housing Research Develops Likely Uses.

SHRDLU Has Reader Dumbbells Like Us.

STEEL Has Repeatedly Debunked Legislative Utopianism.

Come on, youse guys, get out your pencils and paper. Only 17 more days until the contest closes.

—SHRDLU

Transportation

Track Material Prices, Page 71

Seaboard Air Line is inquiring for 12,000 tons of rails for laying this year, in addition to accessory requirements noted last week.

Chesapeake & Ohio has taken bids on 4000 tons of steel rails and 200 tons of fastenings. Arundel Corp., Baltimore, is low bidder on general contract for relocating Wheeling & Lake Erie tracks at Dover, O., in the Muskingum conservancy district, under direction of United States engineers at Zanesville, O. It will require 4968 tons of rails, 173 tons of splice bars, 782 tons of tie plates and 117 tons of spikes.

Lima Locomotive Co., Lima, O., has been awarded five high-speed passenger locomotives by the Chesapeake & Ohio. These will not be streamlined and will be built to demonstrate speed ability in the conventional type, to haul heavy steel trains over substantial grades at speed.

Canadian National Railways are inquiring for 15 locomotives, the only important business of this sort pending.

Norfolk Southern will close carbuilders' bids on 500 all-steel box cars July 22.

Quarterly steel requirements of the New York Central have not been awarded, several variations in prices holding up awards. These are believed attributable to errors in calculating freight rates.

Car Orders Placed

Brooklyn-Manhattan Transit Co., New York, bodies for 100 surface cars, to St. Louis Car Co., St. Louis.

Locomotives Placed

Chesapeake & Ohio; five high-speed passenger locomotives, to Lima Locomotive Co., Lima, O.

Car Orders Pending

Norfolk Southern, 500 all-steel box cars; to be built by carbuilders instead of in own shops, as originally reported.

Locomotives Pending

Canadian National, 15 locomotives, bids asked.

Rail Orders Pending

Nickel Plate, 4000 tons, 200 tons accessories; bids in.

Seaboard Air Line, 12,000 tons, for laying in 1935.

Wheeling & Lake Erie railroad, 4968 tons, 1072 tons fastenings, requirements in connection with relocating tracks in the Muskingum, O., conservancy disrict; Arundel Corp., Baltimore, low bidder on general contract.

Buses Booked

J. G. Brill Co., Philadelphia, eight 30-passenger trackless trolleys for Philadelphia Rapid Transit Co.

Pipe

Pipe Prices, Page 71

Pittsburgh — Volume of small-sized orders for tubular products during the first half of July was in excess of the showing through the same period in June, due chiefly to oil country requirements on seamless and encouraging specifications covering mechanical tubing from the automotive trade. The standard pipe market indicates better jobber buying, and in turn, a sustained volume of shipments for home and plant rehabilitation work.

Chicago—Orders for cast pipe still are small and producers see little prospects for early improvement. One responsible factor is the slowness with which approval of loans from the federal work relief fund is being received. Action is awaited on the earliest loan requests made to use these funds. Cast pipe prices are steady, but are tested by only small lots.

Boston—Cast pipe is slightly more active with more projects approaching bidding stage, although federal funds for such work are being released slowly. The New England foundry recently took better than 500 tons, including 250 tons for Quincy, Mass. Merchant steel pipe demand through re-sellers is steady, but not heavy.

New York — Three foundries share in the award of 5000 tons of cement-lined cast iron pipe for this city, delivery to all five borough yards. This is the largest cast pipe purchase in the immediate district in more than a year. Except for the award of close to 500 tons for two PWA projects, Farmington, N. Y., buying is in small lots with inquiry light. Prices are steady and held firm on the New York city bids.

Philadelphia — Lancaster Iron Works, Lancaster, Pa., is low on approximately 10,000 feet of 20-inch steel riveted pipe for the United States engineer, Philadelphia, for Fort Mifflin. Little else is pending locally.

Buffalo — Demand for pipe and fittings for emergency repairs to water lines in the flood areas was large this week with many demands for rush shipments coming from the area approximately 70 miles square in which a cloudburst caused damage estimated at $10,000,000.

San Francisco — Bids have been opened on from 3200 to 3500 tons of 60-inch cast pipe for the White Point outfall sewer, Los Angeles. Alternate bids were taken on reinforced concrete pipe. Demand, generally, has eased off considerably.

Cast Pipe Placed

5000 tons, 6 to 20-inch, cement-lined, New York city, delivery to all five boroughs, divided, Donaldson Iron Works, Emaus, Pa., awarded 600 tons; R. D. Wood & Co., Florence, N. J., awarded approximately 1575 tons; and United States Pipe & Foundry Co., Burlington, N. J., awarded balance.

500 tons, 8 and 12-inch, PWA projects, Farmington, Long Island, N. Y., to United States Pipe & Foundry Co., Burlington, N. J., and Donaldson Iron Works, Emaus, Pa.

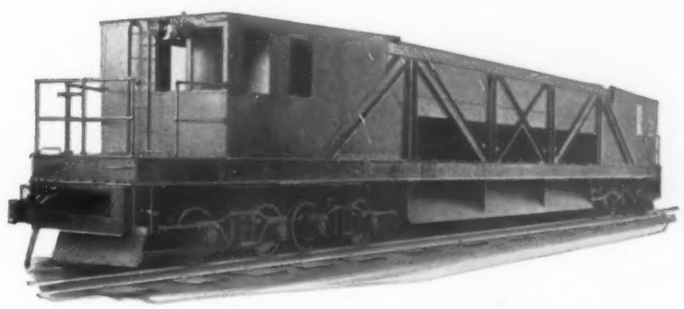
250 tons, 10 and 12-inch, Quincy, Mass., to Warren Foundry & Pipe Co., Boston.

Cast Pipe Pending

3200 to 3500 tons, 60-inch, White Point outfall sewer, Los Angeles; bids in.

315 tons, 16-inch and specials, Washington; bids July 15.

ATLAS ORE TRANSFERS



100 ton—3 compartment Ore Transfer. Roller Bearing Journals. Double end control for car operation. Individually operated discharge gates.

OTHER ATLAS PRODUCTS

Gas-Electric and Diesel-Electric Locomotives . . . Electric Transfer Cars for Blast Furnaces and Steel Plants . . . Stockhouse Scale Cars for Blast Furnaces . . . Concentrate and Calcine Cars for Copper Refineries . . . Automatic and Remote Controlled Electric Cars . . . Pushers, Levellers and Door Extractors . . . Coal Charging Lorries, Coke Guides and Clay Carriers . . . Atlas Patented Coke Quenching Cars for By-Product Coke Ovens . . . Atlas Patented Indicating and Recording Scales . . . Special Cars and Electrically Operated Cars for every conceivable Purpose

THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

181 tons, Garden City, Utah; bids in.
127 tons, 6-inch, San Francisco; American Cast Iron Pipe Co., Birmingham, Ala., low.

Strip Steel

Strip Prices, Page 71

Pittsburgh — Makers of automotive parts are now buying their first strip steel requirements for 1936 models. Not only the automotive industry, but the building trade, hardware, steel furniture, shelving, and miscellaneous users are fair volume buyers. Orders for strip are sufficient to engage hot mills at 38 to 40 per cent and cold strip mills at slightly less. These rates mark considerable improvement from the week of July 4.

Cleveland—Strip steel specifications are relatively small, but makers appear encouraged by the total tonnage being placed at this time of the year. Moderate sized orders are coming from automobile manufacturers for material for both current and new models, and in about the same proportion, according to one producer. The Cleveland strip mill operated last week at 45 per cent.

Chicago — Strip steel demand continues at a higher rate than had been anticipated, with a steady flow of small lots. While no early upturn of marked proportions is looked for the full summer decline is expected to be small and considerably less than that experienced a year ago.

Boston — Improvement in cold-rolled strip volume is spotty, most producers experiencing few gains in narrow widths. Hot-rolled is moving slowly. Miscellaneous outlets account for most business, with consumers buying close to requirements.

New York—Movement of narrow strip is slow with little early improvement expected. Prices are steady.

Philadelphia — Dullness prevails in narrow strip. The market here, has apparently ceased to become an important outlet for this material, as there are not only fewer important consumers in this district than three or four years ago, but more consumers are using slitting machines, buying sheets and cutting them to the widths desired. Strip prices are unchanged at 1.85c, Pittsburgh, or 2.16c, Philadelphia, for hot strip and 2.60c, Pittsburgh, or 2.91c, Philadelphia, for cold strip.

Detroit's Newest Downtown Hotel

DETROIT LELAND

800 OUTSIDE ROOMS
with BATH
$2.50 single $3.50 double

Famous for Fine Foods
Club Breakfasts—
30c . . . 50c . . . 75c
Lunches—
40c . . . 50c . . . 75c
Dinners—
75c . . . $1 . . . $1.25

From the moment you enter our doors you will know that here you are indeed a *guest*. You will appreciate the courteous, cheerful, but *unobtrusive* service for which the Leland is noted. You will revel in the luxury you have a right to expect in a hotel that's as modern as tomorrow's motor car. You will like the superbly convenient downtown location. We hope you will accept our invitation to make the Leland your home in Detroit.

GARAGE IN CONNECTION

(AT CASS AND BAGLEY AVENUES)
DETROIT

Cold Finished

Cold Finished Prices, Page 71

Pittsburgh—An encouraging volume of specifications for cold-finished steel bars continues to be placed by the farm implement trade. Manufacturers are ordering materials in anticipation of a better fall assembly schedule than was first expected. Most farm implement demand is for domestic shipment, but machines for export are being ordered heavily. Jobbers appear more willing to balance their cold-finished bar stocks. The market is firm and without deviation at 1.95c, base, Pittsburgh.

Tin Plate

Tin Plate Prices, Page 70

Pittsburgh—The heaviest volume of specifications in several weeks against canmakers' contracts was issued the past ten days, sustaining a 65 per cent rate of operations. Though a decline in August is expected, it is doubtful if the rate will be much less than 50 per cent over the coming six weeks. Subsequently, a fall upturn in the tin plate business is expected. The market is firmly quoted $5.25 per base box, 2.75c for tin mill sizes of black sheets, and 3.40c, Pittsburgh, on No. 24 unassorted long ternes.

Shapes

Structural Shape Prices, Page 70

New York—Structural contracts approximate 8000 tons, the largest being the New York approach to the Hudson river tuunel, Manhattan-Weehawken, N. J. Awards are featured by requirements placed for the first large apartment house projects in many months, government financed housing jobs excepted. Active pending inquiry is light with no large tonnage projects immediately ahead, although the west side elevated highway, Manhattan, will eventually take 20,000 tons, which may be pushed forward sooner than expected.

Pittsburgh—Bids will be taken soon for the construction of six 200-foot and 12 100-foot steel bridges for the Baltimore & Ohio railroad's relocation of tracks at the Tygarts river, West Virginia, reservoir dam, and another leading inquiry from this district is 3000 tons for a roller gate dam at Winfield, W. Va., on which the Huntington, W. Va., engineers will open bids July 26. Fabricated prices are commencing to show signs of stability, and the market on plain structural shapes is firm at 1.80c, base, Pittsburgh.

Cleveland — Fabricators are figuring on considerable repair work in the flood-damaged New York counties. In Seneca county alone 20 highway bridges were damaged or destroyed. A few awards for private work feature the market here.

Chicago—Inquiries are out for three Mississippi river dams involving about 7500 tons of structural steel, including forgings, castings and floor plates, in addition to 6600 tons of sheet piling. Bids on these dams and on one additional unit close next month. While other inquiries involving large lots are few, an increasing number of small private projects are materializing. Orders are light but the fairly large volume of pending work assures an increase in orders during the next six to eight weeks.

Boston—While much public work is being discussed, little tonnage has reached the bid stage. Fabricating shops have little business on their books and are taking plain material sparingly.

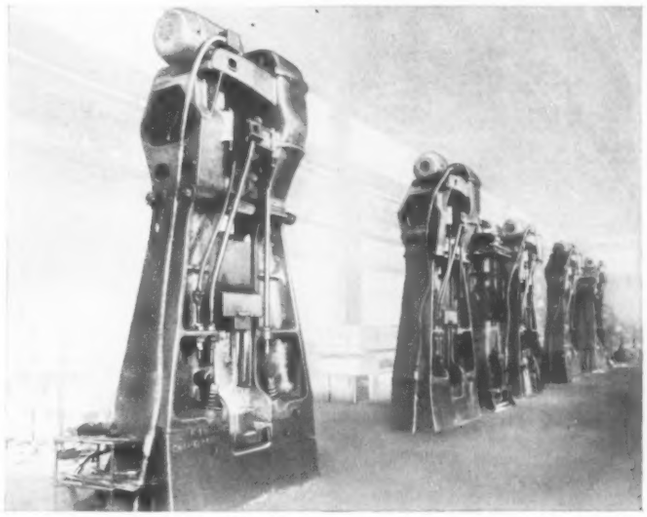
Philadelphia—Award of 800 tons for the Viscose Co. plant addition at Meadville, Pa., by the Wark Co., general contractor, Philadelphia, is outstanding in the local structural market. While postoffice work represents the bulk of inquiry, several postoffice projects on which bids were submitted prior to the collapse of NRA have been withdrawn. It is expected they will be revised later. Fabricated material prices are unsettled, but shape quotations are unchanged at 1.90c, Bethlehem, Pa., or 2.01½c, Philadelphia.

San Francisco—Although structural shape awards in the week were limited to lots of less than 100 tons, at least 31,000 tons now are up for figures or pending. Important among these are 6500 tons for transmission towers for Los Angeles, and 2650 tons for the Seminole dam of the Casper-Alcova project in Wyoming.

Birmingham, Ala. — Structural steel shops are maintaining a steady operating rate, with numerous

Shape Awards Compared

	Tons
Week ended July 13	18,913
Week ended July 6	20,907
Week ended June 29	21,342
This week, 1934	33,023
Weekly average, 1934	16,284
Weekly average, 1935	14,727
Weekly average, June	16,473
Total to date, 1934	509,170
Total to date, 1935	427,086



These hammers have increased production (31%) **. . . they have reduced scrap** (88%) **. . . they have increased die life** (100%).

Chambersburg Model J Board Drop Hammers, whether motor drive (as above) or belt drive, are repeating figures like these (quoted from reports of an actual installation) wherever they are installed as replacements on older hammers. Bulletin 252 tells why.

CHAMBERSBURG
MODEL J
BOARD DROP HAMMER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

small contracts coming in. Bids are in on numerous federal projects.

Shape Contracts Placed

2500 tons, mainly structural, including 173 tons of silicon steel, New York approach to Hudson river tunnel, Manhattan-Weehawken, N. J., to McClintic-Marshall Corp., Bethlehem, Pa., Cornell Contracting Corp., New York, general contractor.

1900 tons, cold strip mill building, Middletown, O., for American Rolling Mill Co., to Ingalls Iron Works Co., Verona, Pa.; F. H. McGraw, New York, general contractor.

1525 tons, stock cellar and washhouse, Stroh Brewery Co., Detroit, to R. C. Mahon Co., Detroit.

1200 tons, high school, Tottenville, Staten Island, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.; through P. Stady & Fuhrman Co.

1150 tons, store and theater building at 1514 Broadway, New York, to Ingalls Iron Works Co., Verona, Pa.; through Hegeman-Harris Co. Inc.

1100 tons, high school, New Dorp, Staten Island, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.; Federal Construction Co., general contractor.

1050 tons, apartment, for Wallenstein interests, West End avenue and Eightieth street, New York, to Harris Structural Steel Co. Inc., New York.

988 tons, Chevrolet forge and bumper plant, Saginaw, Mich., to McClintic-Marshall Corp., Bethlehem, Pa.

830 tons, incinerator, Flushing, N. Y., to Karl Koch Erecting Co., New York, William Kennedy Construction Co., Brooklyn, N. Y., general contractor.

800 tons, plant additions for Viscose Co., Meadville, Pa.; through the Wark Co., general contractor, Philadelphia, to McClintic - Marshall Corp., Bethlehem, Pa.

770 tons, state highway bridge, St. Paul, Minn., to McClintic-Marshall Corp., Bethlehem, Pa.

430 tons, Pennsylvania railroad docks, Erie, Pa., divided between Levinson Steel Co., Pittsburgh, and Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh. Rust Engineering Co., Pittsburgh, general contractor.

410 tons, coal washer plant, Wilmington, Ill., to Ohio Structural Steel Co., Newton Falls, O.

410 tons, factory addition, Alton, Ill., for Owens-Illinois Glass Co., to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, four barges for United States engineers, to Ingalls Iron Works Co., Birmingham.

400 tons, school, Taeneck, N. J., to Selbach-Meyer Co., West New York, N. J.

365 tons, building, Western Automatic Machine Screw Co., Elyria, O., to Ingalls Iron Works Co., Birmingham, Ala.

320 tons, Butler hall, Tarrytown, N. Y., to Joseph T. Ryerson & Son Inc., Jersey City, N. J.

310 tons, building, for Marymont college, Tarrytown, N. Y., to Joseph T. Ryerson & Son, Chicago.

310 tons, building for Marymount collasses Co., Brooklyn, N. Y., to Ingalls Iron Works Co., Verona, Pa.

285 tons, Neisner store No. 100, Cincinnati, to Ingalls Iron Works Co., Birmingham, Ala.

280 tons, Hall China Co. plant, East Liverpool, O., to McClintic-Marshall Corp., Bethlehem, Pa.; steel requirements purchased direct by owner, Heller Bros., Youngstown, O., general contractors.

275 tons, hospital buildings, Mayview, Pa., to Levinson Steel Co., Pittsburgh.

240 tons, still house, New Orleans, for United States Industrial Alcohol Co., to McClintic-Marshall Corp., Bethlehem, Pa.

150 tons, tower tanks, to Ingalls Iron Works Co. Birmingham, Ala.

125 tons, bridge, for city of Miami, Fla., to American Bridge Co., Pittsburgh.

100 tons, school, Lakeville, Conn., to Berlin Construction Co. Inc., Berlin, Conn.; James Stewart & Co. Inc., New York, general contractor.

100 tons, or more, mill addition, Wood Elastic Web Co., Stoughton, Mass., to Bethlehem Fabricators In., Bethlehem, Pa.

100 tons, bridge No. 5425, Climax, Polk county, Minn., to American Bridge Co., Pittsburgh.

100 tons, school and school addition, Red Bank, N. J., to Selbach-Meyer Co., West New York, N. J.

Shape Contracts Pending

10,000 tons, department of interior building, Washington, bids postponed from July 19 to July 26.

3475 tons, including forgings and castings, also 2600 tons of piling, dam No. 18, Burlington, Iowa; bids to United States engineer, Rock Island, Ill., Aug. 14.

3110 tons, structural steel castings, steel piling, and forgings, construction of lock No. 17, Mississippi river near New Boston, Ill.; lock to be 110 feet wide x 600 feet long; bids July 29.

2000 tons, including forgings and castings, also 1700 tons of piling, dam No. 7, La Crosse, Wis.; bids to United States engineers, St. Paul, Aug. 8.

2000 tons, including forgings and castings, also 2300 tons of piling, dam No. 8, Genoa, Wis.; bids to United States engineer, St. Paul, Aug. 20.

1000 tons, theater, Stanford university, Calif.; plans being prepared.

800 tons, postoffice, Atlantic City, N. J.

500 tons, plant addition, Downingtown Paper Co., Dowingtown, Pa., bids to be closed early this week.

400 tons, federal mint building extension, Denver.

300 tons, building, state school, Rome, N. Y.; bids July 24.

187 tons, bridge work at Dover, O., in Muskingum conservancy district, for United States engineer, Zanesville, O.; Arundel Corp., Baltimore, low for general contract. Project also takes 590 tons of reinforcing bars; and 4968 tons of rails and 1072 tons of fastenings for relocating Wheeling & Lake Erie tracks.

140 tons, state highway bridge, Wellsburg, W. Va., Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, low, on July 9 bids.

Unstated tonnage, paint shop, Union Tank Car Co., Hammond, Ind.; Campbell-Lowrie-Loutermilch Corp., Chicago, general contractor.

Unstated tonnage, office building addition, General American Tank Car Corp., East Chicago, Ind.; Louis C. Hess, Hammond, Ind., architect.

Unstated tonnage, plant addition, Chicago Rawhide Mfg. Co., Chicago; Otto Monberg, Chicago, architect.

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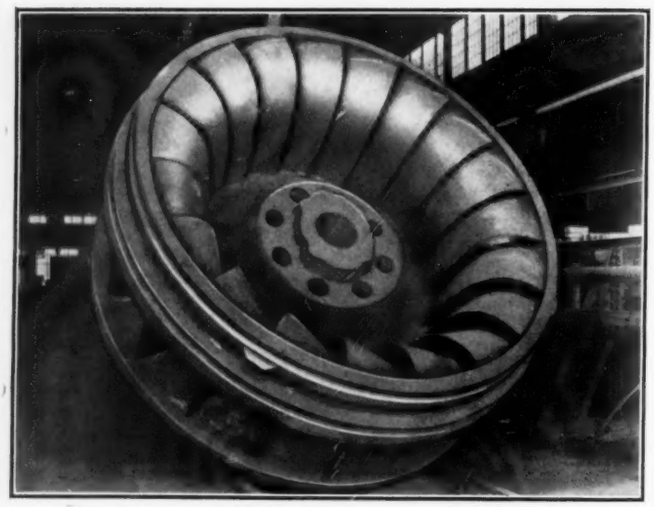

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Reinforcing

Reinforcing Bar Prices, Page 71

New York—Award of 1400 tons for the New York approach to the Hudson river tunnel to Weehawken, N. J., features reinforcing steel buying. Estimated tonnage still active, about 2500 tons, includes close to 900 tons for the Ward Island sewage plant, bids on which close July 23. Prices are steady on billet bars, despite considerable pressure by contractors for concessions.

Pittsburgh—Investigation into the delay attending advertisement for bids on nine important projects by the Allegheny county authority is holding up a large potential demand in this district for reinforcing steel bars. A few small jobs are going to award and reflect a more liberal attitude among private builders. The reinforcing steel bar market is firmly quoted at 2.05c, base, Pittsburgh, by producing mills for carload quantities, cut lengths, in new billet quality. For rail steel bars, the quotation is 1.90c, Pittsburgh, also quoted by distributors, and for warehouse shipment delivered in Allegheny county, plain reinforcing bars are 3.05c, and twisted squares, 3.175c.

Cleveland—Arundel Corp., Baltimore, is low bidder for the general contract for government work in the Muskingum conservancy district, at Dover, O., which will require 590 tons of reinforcing bars, 187 tons of structural shapes, and 6040 tons of rails and fastenings for relocating Wheeling & Lake Erie tracks. Substantial tonnage will be required for the government's Whisky island housing project in Cleveland, on which bids will be taken Aug. 15, and for the Outhwaite housing project, bids Aug. 12. Currently, bar purchases are light.

Chicago—Concrete bar distributors report an increasing number of small jobs, largely of a private nature. These include store and industrial plant additions and remodeling, and though individual tonnages required usually are less than 100 tons, the aggregate is fairly large and is increasing. Mississippi river dams represent the largest projects in new inquiries, about 2300 tons being involved in three units on which bids close next month.

Boston—Reinforcing steel buying is light. Because local labor will be benefited more, some projects originally planned for structural steel are to go reinforced concrete, notably grade crossings.

Philadelphia — Local reinforcing bar sellers are watching developments closely at Washington, in connection with grade crossing elimination and road work, in the belief that this work, after all, will proceed on a basis of expenditure which will permit many plans now prepared to be used, instead of being drastically revised as was recently indicated. The local market is quiet.

San Francisco—Close to 1000 tons of reinforcing bars were placed during the week. Bids have been opened on 2450 tons for an outfall sewer in Los Angeles, and on 1100 tons, plac-

Concrete Awards Compared

	Tons
Week ended July 13	2,485
Week ended July 6	399
Week ended June 29	6,360
This week in 1934	3,323
Weekly average, 1934	4,084
Weekly average, 1935	4,424
Weekly average, June	3,931
Total to date, 1934	134,776
Total to date, 1935	128,298

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ing only, for the Casper-Alcova dam in Wyoming.

Reinforcing Steel Awards

1400 tons, tunnel approach and plaza, New York side, Hudson river tunnel, Manhattan-Weehawken, N. J., to Kalman Steel Corp., Bethlehem, Pa.; Cornell Contracting Corp., New York, general contractor.

250 tons, Home for Boys, Van Nuys, Calif., to unnamed interest.

250 tons, administration building, Lafayette, Jr., high school, Los Angeles, to unnamed interest.

200 tons, housing project, Montgomery, Ala., to Virginia Steel Co., Birmingham, Ala.; T. L. James & Co. Inc., Ruston, La. general contractor.

150 tons, alterations to Gardens high school, Los Angeles, to unnamed interest.

150 tons, school, Olean, N. Y., to Kalman Steel Corp., Bethlehem, Pa.

135 tons, Bill's Brooks dam project, Hartford, Conn., to Concrete Steel Co., New York; through B. Perini & Sons Co., Framingham, Mass.

Reinforcing Steel Pending

1500 tons, estimated, grade crossing for Staten Island Rapid Transit Co., at Elm Park and Mariners Harbor, Staten Island, N. Y.; bids July 30.

850 tons, additional work, Wards Island sewage disposal plant, New York, postponed bids to July 23.

600 tons, dam No. 18, Burlington, Iowa; bids to United States engineer, Rock Island, Ill., Aug. 14.

590 tons, bridge work at Dover, O., in Muskingum conservancy district, for United States engineer, Zanesville, O.; Arundel Corp., Baltimore, low bidder for general contract. Project also takes 187 tons of fabricated shapes; and 4968 tons of rails and 1072 tons of fastenings for relocation of Wheeling & Lake Erie tracks.

564 tons, dam No. 8, Genoa, Wis.; bids to United States engineer, St. Paul, Aug. 20.

550 tons, 3.83 miles state highway, Interborough Parkway, Queens, New York, A. W. Banko Inc., Hastings-on-Hudson, general contractor.

480 tons, dam No. 7, La Crosse, Wis.; bids to United States engineer, St. Paul, Aug. 8.

300 tons, administration and toll building, San Francisco-Oakland, Calif., bridge; bids July 26.

200 tons, piers for state highway bridge, Wellsburg, W. Va.; Holt, McConnell & Osburn, Canonsburg, Pa., low on general contract bids July 9.

200 tons, 2.76 miles state highway, Grand Island, South Parkway, Erie county, New York; C. B. Whitmore Co., Lockport, N. Y., general contractor.

125 tons, sewage project, Elizabeth, N. J.; general contractor bids in.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 71

Among prominent bolt, nut, and rivet inquiries at present are those of the Chesapeake & Ohio railroad freight car requirements, on which it is reported purchase has not yet been decided. Purchaser will either be this railroad, or the car shops to which the freight cars were allocated two weeks ago. The navy is out with a fairly large bolt, nut, and rivet inquiry for shipment to various navy yards, and another prominent inquiry from the same buyer concerns requirements for 13 cruisers. Small-lot specifications for bolts, nuts, and rivets are in practically unchanged volume compared with June. The market is usually quoted 70-10-5 off list for bolts and nuts to the general trade, 2.90c Pittsburgh and Cleveland, 3.00c, Chicago, on large rivets, and 70-5 off list for small rivets. Concessions, however, from these levels are available in certain cases.

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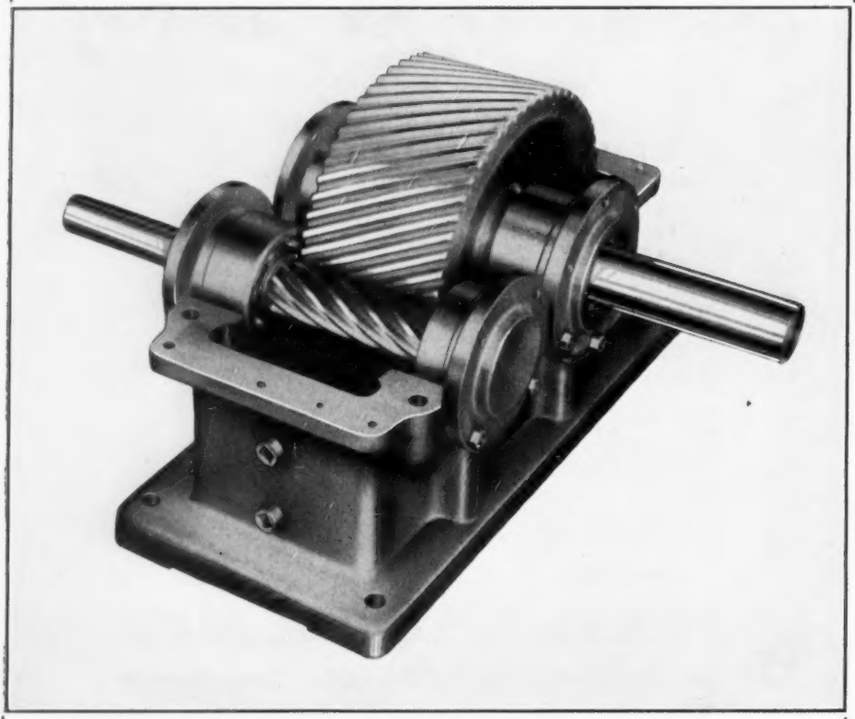

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Wire

Wire Prices, Page 71

Pittsburgh — Instead of decline in specifications for wire products usually expected in July, advances in specifications place the month to date ahead of June. A few automobile manufacturers have placed third-quarter wire contracts, paying the full market for their requirements. A heavy demand for fence, barbed wire, and other rural wire products continues noteworthy. Plain manufacturing wire is firm at 2.30c, base, Pittsburgh, nails, $2.60 per keg, spring wire, 2.90c, and woven wire fencing, $63 per base column. The market on annealed fence wire is 2.45c, and on galvanized fence wire, 2.80c, base.

Cleveland—Miscellaneous demand for manufacturers' wire is well sustained, but orders for farm material are tapering. Prices are steady.

Chicago — Steel wire demand is slow to recede, activity recently showing only a small decrease from a month ago. A number of miscellaneous consumers of manufacturers' wire are maintaining fairly steady operations. Wire prices continue steady.

Boston—Incoming business since the holiday has been below expectations. Specialties and manufacturers' wire lead demand. There is little advance buying and consumers stress early delivery. Mill prices are holding, but some shading by secondary distributors continues.

Philadelphia — Although still holding better than expected, agricultural wire requirements continue to decline, reflecting seasonal influences. However, flood damage in eastern Pennsylvania has stimulated some demand for nails. Prices are unchanged.

Pig Iron

Pig Iron Prices, Page 72

Pittsburgh — Standard Sanitary Mfg. Co., which will reopen its Woods Run plant on the north side here around Aug. 1 after inactivity of three years, has negotiated a small purchase of pig iron for the foundry department. The local Standard Sanitary foundry will use southern pig iron of high-phosphorus analysis, which is favored for machining qualities. Carload pig iron shipments are more frequent, but the larger tonnage requirements of basic iron users are under contract and do not appear to be a matter for open market inquiry for some time.

Cleveland—For July, the market is fairly encouraging. Melters buy relatively small lots, as required. An exception was the purchase of 1500 tons by one consumer from a lake furnace interest recently. Sales here for the week totaled 2500 tons. Shipments rallied, after the slow movement in the week of July 4, but are at a slightly lower daily average than in June.

Chicago — July pig iron shipments are expected to show less than the usual seasonal decrease from June. Deliveries to date are off 18 per cent from the corresponding period a month ago, but the decrease for the full 31 days is expected to be smaller than this figure. Farm implement manufacturers continue outstanding among the larger consumers in maintaining previous schedules, though manufacturers of radiation and plumbing equipment have a comparable record. Pig iron consumers occasionally show concern over possibilities of higher prices later in the year, but current buying is for early needs. The market is firm at $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron sales are light and in small lots. Domestic prices are unchanged and firm, but foreign iron in storage at three New England ports moves, generally in small shipments, 50 cents or more a ton under. Foundry melt is light even for this season.

New York—Small-lot buying of pig iron continues, with general volume not far below that of the corresponding period of last month, according to leading sellers. Domestic prices are unchanged.

Philadelphia — Carlot buying still dominates pig iron business here. Volume so far has proved to be only slightly under the corresponding period last month. Pipemakers appear to have enough iron on hand to cover needs over the greater part of the second half; only an unexpectedly sharp spurt in their business or especially attractive prices on iron would be responsible for any substantial buying in these quarters, it appears. Cast pipe makers are now estimated to be operating around 30 per cent. A purchaser of fair-size tonnage of foreign iron is understood to be trying to dispose of the tonnage to other consumers. Domestic prices are steady.

Buffalo — Evidence of the low stocks of pig iron consumers was found this week following the floods in central New York. Frantic calls came from a score of consumers when shipments were delayed only four or five days by the railroad tie-up resulting from the flood. Producers speeded up movement of iron in transit at the time of the cloudburst which wiped out scores of bridges and washed out miles of track between here and seaboard, but numerous foundries were compelled to close because new stocks of iron did not reach them in time, it was reported. Six furnaces are in production here and a seventh, that of American Radiator Co., goes into blast about Aug. 1.

St. Louis — Fair interest in third quarter iron supplies has developed. Thus far, however, there have been only a limited number of commitments for later than Aug. 1. Buying is diversified, among the interests participating being stove, farm implement, washing machine, jobbing foundries and machinery makers.

Cincinnati — Anticipatory purchasing for third quarter pig iron needs eased the past week, since active interests had covered the previous week. Shipment of iron on contract is about equal to the corresponding period in June.

Birmingham, Ala.—Consumers of pig iron are confident over future prospects and while purchases will not be in large quantities they will be more numerous. Production for first half year is given at 654,583 tons as compared to 427,830 tons for last half of 1934 and 783,906 tons for first half of last year.

Toronto, Ont. — New business in pig iron is steady. Melters are taking iron as demands dictate. The daily melt is holding around 40 to 45 per cent. Iron production is sustained, with three stacks blowing.

Semifinished

Semifinished Prices, Page 71

Most finishing mills have restricted their inventories of semifinished steel. The movement of alloy and carbon steel forging quality billets to the automotive industry still is encouraging, and tin plate rollers are a source of strong demand for

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semifinished. Sheet bars remain $28, base, Pittsburgh; and billets, blooms, and slabs, $27, Pittsburgh. Wire rods are $38; forging quality carbon billets, $32; and skelp, $34.

Scrap

Scrap Prices, Page 73

Pittsburgh — A down-river independent mill last week negotiated the purchase of a small quantity of No. 1 heavy melting steel at $12 a ton, thus proving the present market range of $11.75 to $12.25. During the week a marked preference was shown for railroad heavy melting scrap, and not only did the Baltimore & Ohio sell its 1500 tons of heavy melting steel for $12.50 a ton, Pittsburgh district delivery, but the Pennsylvania railroad is understood to have sold its scrap for better than this figure. Also, for Pittsburgh shipment, a tonnage of iron car wheels was sold by a railroad last week for $13 a ton, and specialties brought $14.50. For local shipment, blast furnace scrap remains entirely nominal at $6.50 to $7, and low phos crop ends, $15 to $15.50. Hydraulic compressed sheet scrap retains its $11.75 to $12.25 level.

Cleveland — The underlying strength of the northern Ohio iron and steel scrap markets finally is being translated into rising quotations, with dealers paying considerably more than recent levels. This higher priced material is being laid down as yard stocks evidently in the belief that it will command even better prices later. Increases range from $1 to $2 per ton. The Youngstown market also continues to show new strength.

Chicago—Despite absence of mill buying, scrap prices remain strong. Sellers find it difficult to pick up anything beyond small lots of quality material around recent market prices. While the consumers' market for heavy melting steel continues $9.75 to $10.25 on the basis of last sales, the top of the range approximates brokers' bids. Only small tonnages are being offered by railroads.

Boston — Within the last two weeks about 17,800 tons of scrap, mostly heavy melting steel, has been loaded here for export and buying continues mostly for boat loading with prices firm at $8.50, dock, for No. 1 and $7.50 for No. 2. Domestic buying is light with melters generally refusing to better bids, export business being the only factor tending to steady the price. Supply of heavy melting steel for export holds surprisingly well in view of heavy buying and still appears to come out freely.

New York—Scrap yard employes have returned to work after a 10-day strike which tied up a number of yards. New scrap buying is light for both domestic and export shipment. Some No. 2 steel scrap continues to move to the Buffalo district and small lots of various grades to other consuming points. Prices are unchanged.

Philadelphia—Scrap prices are strong, although at the moment, at least, unchanged. The inside price of $10, delivered, on No. 1 steel is becoming increasingly difficult for consumers to obtain, and the same is true of $9.50, delivered, for No. 2 steel, as this material is becoming increasingly scarce at this price, with four or five district consumers competing, in addition to foreign buyers. Recent reductions on new tonnage for export have not been reflected in lower wharf prices here, the market continuing $9.50 and $8.50, wharf, for No. 1 and No. 2 steel, respectively. The present movement is against back orders.

Buffalo—Purchases of No. 2 heavy melting steel by a local melter have mounted to 10,000 tons, it is claimed. Dealers who shared in the business say they will receive $9.75 for this material and $10.75 if any No. 1 is included. Delivery of the latter is improbable as dealers are reported bidding $10.75 to $11.25 for No. 1 steel. Scrap is coming out slowly and dealers predict substantial advances will appear when the next sales of several leading materials are made. Claim is made that blast furnace scrap brought $7 at a nearby point.

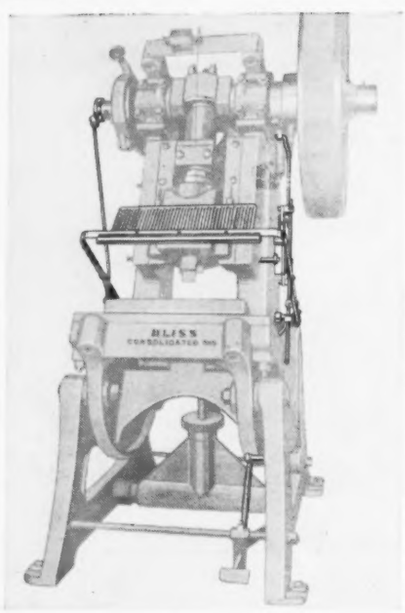
Detroit—The iron and steel scrap market has definitely turned upward. Heavy breakable cast has advanced $1 per ton, No. 2 busheling 50 cents, and most other grades including melting steel and bundles, 25 cents. This follows increased demand, both locally and from the Youngstown district, accompanied by a lessening of supplies from automobile manufacturers. More material is moving out by water to Cleveland and Buffalo. The situation generally appears strong.

Cincinnati—Mill interest in scrap purchases is confined to scattered small tonnages. Inventories, representing about two months requirements, have been built up during the earlier part of the year and account for consumer apathy.

St. Louis—Dullness prevails in iron and steel scrap. An easier undertone has been in evidence, chiefly in steelmaking grades. Certain grades of heavy melting steel were reduced 25 cents per ton and at the lower rate failed to develop activity.

Birmingham, Ala.—No change is apparent in the market for steel and iron scrap, and prices are firm.

Toronto, Ont.—Trading in iron and steel scrap in the local market was slow during the week, but Montreal dealers report fair movement. Minor shipments of heavy melting steel were made to the Hamilton district, but otherwise there was little action in steel grades. No. 1 machinery cast has a steady market demand in small lots. Dealers are taking some scrap but offerings are limited and prices unchanged.



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Iron Ore

Iron Ore Prices, Page 73

Cleveland—Iron ore receipts at Lake Erie ports in June totaled 3,001,735 tons, compared with 3,117,649 tons in the month last year. Shipments from the ports to interior furnaces amounted to 2,202,576 tons, compared with 2,426,860 tons in June, 1934. Receipts and shipments for the season to July 1, and dock balances, as reported by the Lake Superior Iron Ore association, follow:

	Receipts	Shipments season	Dock bal. July 1,'35
Buffalo	580,068	65	2,806
Erie	311,695	323,811	85,974
Conneaut	1,027,479	1,170,975	1,551,442
Ashtabula	508,928	632,954	1,148,905
Fairport	197,638	199,304	387,403
Cleveland	1,303,238	1,240,862	643,157
Lorain	837,884	429,502	12,527
Huron	214,125	216,075	316,954
Toledo	347,912	128,998	11,705
Total	5,328,967	4,342,546	4,160,873
Year ago	4,585,240	4,107,531	4,342,996

Receipts for the season at other lake ports:

	Tons
Detroit	349,685
Indiana Harbor	543,945
Gary	419,718
South Chicago, local fces	786,590
South Chicago, interior fces	.....
Sault Ste. Marie, Ontario	15,350
Hamilton, Ontario	139,058
Total	2,254,346
Comparative, 1 year ago	1,833,705
Total recipts, lower lake ports	7,583,313

The Erie railroad docks, Cleveland, July 10 unloaded a total of 40,002 tons of ore from three vessels in 20 hours, 30 minutes, at the rate of 2200 tons an hour. The vessels were the JOSEPH FRANTZ, PONTIAC, and WILLIAM G. MATHER, of the Cleveland-Cliffs Iron Co.'s fleet. This probably was a record for sustained unloading.

The ore market is in the mid-season doldrums, with no new demand apparent, and interest centered on shipments.

Warehouse

Warehouse Prices, Page 74

Pittsburgh—The local warehouse market, for Allegheny county shipment, is steady. From a price standpoint the market is firm, but demand is ebbing.

New York—Sales with most warehouses are slightly below the rate of last month, due partly to the holiday. Buying is well spread as to products, volume made up generally of small orders, large individual purchases being the exception. Prices are steady.

Cleveland—Volume of warehouse orders here so far this month is fractionally larger than in the comparable period in June. Prices are firm.

Chicago — Sales are moving counter to the usual trend in holding closely to the June rate. Prices are unchanged and holding reasonably firm.

Boston—Warehouse volume has not recovered from recent slight losses. While denied in some quarters, rumors continue of shading on some products by a few distributors in isolated instances.

Philadelphia — Jobbers have modified prices on boiler tubes as a result of the recent change by mills. Under the new plan jobbers' prices will be the same as the mills' on lots of one ton and over. Otherwise, warehouse prices are unchanged. Buying reflects seasonal dullness.

St. Louis—Iron and steel warehouse trade is steady, with July business comparing favorably with the like period in June. The movement of bale ties is underway in considerable volume.

Detroit—Moving into the middle of July, business in iron and steel warehouse products is holding even with the June rate, which is seasonally good. Prices are unchanged.

Ferroalloys

Ferroalloy Prices, Page 72

New York—Ferromanganese specifications are being fairly sustained, with some sellers doubtful if there will be any marked decline from last month. Meanwhile, prices are steady at $85, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, is holding at $26, Palmerton, Pa., on lots up to 50 tons and $24 on 50 tons and over. Releases are fair.

Metallurgical Coke

Coke Prices, Page 71

Consumers of beehive furnace coke are uncovering their ability to purchase at $3.25 a ton for standard grades, Connellsville, Pa., oven base. A complication in the present market results over discounts. For instance, one important buyer in this district is still paying $3.60 for standard 72-hour furnace coke, but less discounts, the net price is around $3.40. On

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common beehive foundry coke, the market has softened to a quotable range of $4 to $4.35 and some contracts have been made within this range. There has been buying of premium foundry coke at less than $5.10 per ton, Connellsville, Pa., ovens, and this grade is quotably lower.

By-product coke for foundry use is moving in slightly less volume at all centers. The heavy buying earlier is partly responsible for this. Prices are holding firmly.

Steel in Europe

Foreign Steel Prices, Page 74

London—(*By Radio*) — Domestic steel and iron trade in Great Britain continues brisk, the summer recession not being as noticeable as in recent years. Middlesbrough pig iron producers are booked for two to three months. Midland and Scottish works are busy. Contracts for rolling stock for Indian and South African railroads have been booked. Exports of galvanized sheets are active and tin plate trade is fair.

Production of steel and pig iron in Great Britain in June fell below May, partly due to the shorter month. Steel ingot and casting output in June was 770,000 gross tons, a daily average of 30,800 tons, compared with 853,300 tons in May, an average of 31,600 tons. The loss for the month was 83,300 tons. Pig iron output in June was 529,300 gross tons, a daily average of 17,643 tons, compared with 558,900 tons in May, a daily average of 18,029 tons, a loss of 29,600 tons for the month. Active stacks numbered 97 at the close of each month.

From the Continent come reports of dull conditions, awaiting reopening of the British market early in August. Germany is doing some business with South America and the Far East.

Coke By-Products

Coke By-Product Prices, Page 74

New York—Current output of distillates is going directly into consumption with no accumulation of material. Toluol and benzol supplies are short with some distributors well sold ahead on both. Industrial demand for benzol has improved. Uncertainty of prices on early fall material has had a tendency to retard trading in sulphate of ammonia. Napthalene volume is limited to spot lots as a rule with prices somewhat irregular. Routine business in phenol continues with prices unchanged.

Nonferrous Metals

Nonferrous Metal Prices, Page 72

New York—Sentiment was more buoyant in nonferrous metal markets last week. Moderate to fair business was done in most metals with prices generally steady. Lead and copper were outstanding in that the former advanced $2 a ton and the latter was shaded on one large transaction.

Copper—The market was temporarily unsettled Tuesday when 5000 tons of electrolytic sold at 7.75c, Connecticut. Most mine producers and custom smelters, however, continued to quote 8.00c which held steady during the remainder of the week. Consumers who attempted to get metal under the general market level following the shaded sale were unsuccessful and the price appears to be well established. Factors aiding confidence in the domestic market were higher prices and more active sales abroad and increased independent consumer buying here.

Lead—Price was advanced $1 a ton on Monday and again on Tuesday following a like advance Friday. The successive rises reflected increased consumer demand. St. Joseph Lead Co. continued to ask $1 premium on the New York market, or 4.20c but quoted the same as other leading producers in East St. Louis, or 4.00c.

Zinc—Market tone was firm at 4.30c, East St. Louis, for prime western with a fair amount of business transacted.

Tin—Straits tin prices held fairly steady with closing prices quoted around 52.00c on spot. Demand was generally light.

Antimony — Extreme quietness characterized the market on most days. Prices on Chinese metal were nominal in absence of adequate supplies.

Aluminum—Market was quiet with prices unchanged. Virgin ninety-nine per cent ingot was still available at 19.00c to 21.00c.

Refractories

Refractories Prices, Page 72

Pittsburgh—Refractory brick producers continue to hold prices on fire clay, silica, magnesite, and basic brick. The only recent change is an advance of $2.50 per net ton on chemically-bonded chrome brick. The refractories market forecasts some large orders for several coke oven installations and a few blast furnace relining projects. Fire clay brick, Pennsylvania works, continues $45 per 1000, second quality, $40, and silica brick, $45. Malleable bung brick is quoted $50, all bases. STEEL, page 72, begins quotations on super fire clay brick, for which recently there has been considerable demand.

Northwestern Barb Wire Co., Sterling, Ill., manufacturer of woven wire field fence, nails, staples and other wire products, has opened a sales office and branch warehouse at 1005 Dace street, Sioux City, Iowa, in charge of Lee Bundy.

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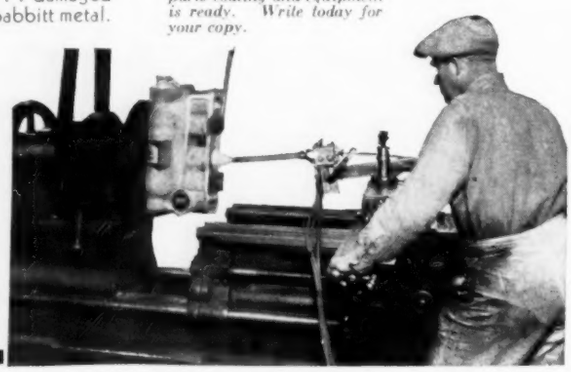

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Activities of Steel Users and Makers

FOX CO., Cincinnati, manufacturer of metal specialties, badges and emblems, has bought the plant of the Davis Welding Co., 3400 Beekman street, and will occupy it about Sept. 1. An office building and 50-foot plant extension will be built at once. Leonard and Milford Fox are sole owners, under a partnership. Marguerite Barr is assistant to the Fox brothers, Edward M. Laws general superintendent, George Guenther chief engineer, Homer Kincade chief inspector, and E. J. Murray purchasing agent. Davis Welding Co. is transferring activities from its Beekman street plant to its works at 1110 Richmond street.

◆ ◆ ◆

Link-Belt Co., shovel and crane division, Chicago, has appointed Henry A. Petter Supply Co., Paducah, Ky., distributor for its crawler-mounted shovels, cranes and drag-lines and track-type locomotive cranes.

◆ ◆ ◆

Farrel-Birmingham Co. Inc., Buffalo, has appointed Sterling-French Machinery Co., New Center building, Detroit, its representative for sale of Sykes gear generators in Detroit territory.

◆ ◆ ◆

Sharon Steel Hoop Co.'s Cleveland district sales offices, Union Trust building, Cleveland, has taken over the sales agency of the Niles Rolling Mill Co., Niles O., in the Cleveland district.

◆ ◆ ◆

Austin-Hastings Co. Inc., Cambridge, Mass., has added a sheet metal department, under charge of Harry L. Doten and the staff of salesmen formerly employed by Harry L. Doten & Sons, Boston, the latter firm having decided to liquidate.

◆ ◆ ◆

Marr-Galbreath Machinery Co., 55 Water street, Pittsburgh, has bought the entire plant of the Lincoln Scale Corp., Latrobe, Pa., consisting of modern machines, motor driven, and small tools. They are to be offered at once for resale.

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Ferro Enamel Corp., Cleveland, has opened offices at Sao Paulo, Brazil, and Melbourne, Australia. The company already has foreign plants in Holland, England, France and Canada. C. D. Clawson, export manager, will go to South America to become managing director.

◆ ◆ ◆

Reed-Prentice Corp., Worcester, Mass., has appointed J. S. Miller Machinery Co., Pittsburgh, its exclusive agent in Pittsburgh territory for sale of engine, toolroom and production lathes, vertical milling and die sinking machines.

◆ ◆ ◆

Allis-Chalmers Mfg. Co., Milwaukee, is operating its tractor department in day and night shifts, with production of about 2500 per month. The usual slackness in summer has not been apparent this year. Total employment by the company is about 8000, compared with 6000 a year ago.

◆ ◆ ◆

Harnischfeger Corp., Milwaukee, has established a school for welding operators at Hoboken, N. J., under supervision of William Bozman, eastern service manager. It offers a complete course in all types of ferrous and nonferrous welding and will serve as a clinic where problems of P&H-Hansen operators may be worked out without charge for instruction.

◆ ◆ ◆

Buell Engineering Co. Inc., 70 Pine street, New York, has been formed to produce drying systems of rotary, turbo and fine-film types and dust extractors for fly ash from stacks as well as from chemical and cement plants. Burners and pulverizing sets for power and industrial grinding are also to be made. Directors include H. S. Emlaw and F. C. Baker, directors of Gold Fields American Development; S. H. Menzies, representing English interests; T. J. Dillon of the Struthers-Wells-Titusville Corp., Warren, Pa.

◆ ◆ ◆

Hill Clutch Machine & Foundry Co., 6400 Breakwater avenue, Cleveland, has bought all the assets of the Canton Foundry & Machine Co., Canton, O., and will continue to operate it without change of name, as a division of the Cleveland company. Main offices will remain at Canton for the present. Officers of the new division are: President, J. R. Bucher; vice president, A. C. McDaniel; secretary and treasurer, Milo Firestone. The Canton company is manufacturer of all-steel alligator shears, portable cranes and industrial and automobile turntables.

◆ ◆ ◆

Compagnia Tecnica Industrie Petroli S.A.I., Milan, Italy, has completed a license agreement with the Chicago Bridge & Iron Works, Chicago, covering sale, manufacture and erection of Wiggins floating roofs and Wiggins breather roofs for oil storage tanks in Italy. Other firms licensed to manufacture Wiggins roofs in foreign countries are: Horton Steel Works Ltd., Fort Erie, Ont.; Motherwell Bridge & Engineering Co. Ltd., Motherwell, Scotland; Whessoe Foundry & Engineering Co. Ltd., Darlington, Eng.; Worms & Cie., LeTrait, France; Asano Bussan Co. Ltd., Tokyo, Japan.

◆ ◆ ◆

Osborn Machine Co., DuBois, Pa., has opened a sales office at 820 Empire building, Pittsburgh, in charge of C. K. Wehn, who was recently made general sales manager. He formerly was sales manager for the Pennsylvania Fabrication Co., Pittsburgh, and before that was district sales manager in the Pittsburgh territory for H. K. Ferguson Co., Cleveland. James J. Zimmerman has been made works manager by the Osborn Co. He formerly was produc-

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NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNA.

tion manager for the Elliott Co., Jeanette, Pa., assistant general superintendent of the Scott foundry of the Reading Iron Co., Reading, Pa., and was employed in various capacities by the Cambria Steel Co., Johnstown, Pa.

Financial

AN INDEPENDENT committee for bondholders of Follansbee Bros. Co., Pittsburgh, has been organized, intending to intervene in the reorganization proceedings now pending in federal court and file a plan of its own reorganization under Section 77-B of the bankruptcy act. Prof. John M. Chapman, of Columbia university, New York, is chairman.

TRANSUE NET TOPS 1934

Transue & Williams Steel Forging Corp., Alliance, O., reports net of $21,556, after taxes, in the second quarter, compared with a profit of $54,623 in the first quarter and $9806 in the second quarter of 1934.

NATIONAL AGAIN PAYS 37½

National Steel Corp., Pittsburgh, has declared the regular quarterly dividend of 25 cents and an extra of 12½ cents, as in the past two quarters, payable July 31 to record of July 22.

ALLEGHENY TO ISSUE SHARES

Allegheny Steel Co., of Brackenridge, Pa., has filed a registration statement with the securities and exchange commission seeking to issue 60,000 shares of no par common stock held by Harry E. Sheldon, president; L. W. Hicks, vice president; the estate of R. D. Campbell, and Mrs. Harry E. Sheldon. The proposed maximum offering price is $30 a share; none of the proceeds of the sale is to be received by the company.

The Allegheny company is also seeking to issue 18,722 shares of no par common stock, to be offered from time to time at market, in payment of additional compensation under contracts with employes, and for such other purposes as directors may determine.

Safety

CARNEGIE STEEL CO.'S Homestead, Pa., plant established a new alltime safety record in June, based on 803,719 man hours worked with an accident frequency of 5.0, when only four employes were injured seriously enough to force them from work. The previous record was a 6.54 accident frequency in May, 1932.

Meetings

PURCHASING agents of Philadelphia held their annual outing at the Coatesville Country Club, Coatesville, Pa., July 11. They were luncheon guests of Lukens Steel Co., that city.

BENNETT OFFICIAL HOST

C. W. Bennett, president, American Sheet & Tin Plate Co., will act as official host to engineers and executives, expected to exceed 10,000, attending the thirty-first convention and iron and steel exposition of the Association of Iron and Steel Engineers at the William Penn hotel, Pittsburgh, Sept. 24-26.

FARREL GATHERS SALES FORCE

Farrel-Birmingham Co. Inc., Ansonia, Conn., in the last week of June assembled its sales force for the annual sales conference. Carl Hitchcock, vice president, was in charge in the absence of N. W. Pickering, president, in Europe.

Steel in the News

ITEM for structural fabricators: Henri Rush, former chief engineer for St. Louis, has designed a 196-story building 2000 feet high, housing 250,000 persons, costing $223,000,000, completely air-conditioned, finished in white terra cotta, requiring 100,000 men four years to complete, equipped with 126 passenger and 72 freight elevators. Structural steel tonnage is not yet known and bids are not yet asked for. By comparison, the Empire State building in New York is 85 stories high.

Mirrors of Motordom

(*Concluded from Page* 24)

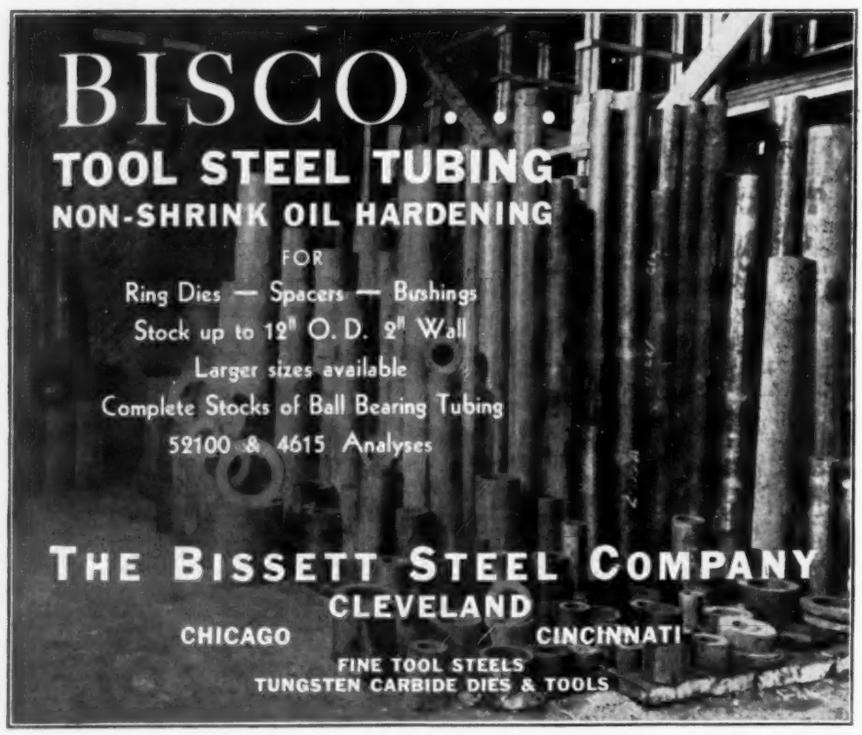
by the almost complete disappearance of malleable iron from the-then Model A. However, this is now water over the dam, and the Ford crankshaft, camshaft and shortly also the pistons are castings, as are many other parts.

Incidentally, the stock of some companies making aluminum pistons has experienced a sharp recession recently, which some attribute to this new Ford situation.

General Motors has sent its stockholders a blast against the administration's tax program, pointing out that to destroy or limit "business bigness" is to assure increased unemployment.

Carried to its extreme, the Roosevelt program would break off Chevrolet, Pontiac, Olds, Buick, Cadillac-LaSalle and other manufacturing divisions as separate entities. As a matter of fact, the autonomy embraced by these divisions is already extensive, and while they draw upon a common fund of engineering experimentation they compete sharply with each other. The elimination of consolidated returns, which is not now contemplated, would operate against a large aggregate like General Motors.

On July 9, 1909, the first Hudson came off the production line in Detroit. On July 9, 1935, Hudson-built



car No. 2,262,810 was assembled .... Studebaker is reported redesigning its lines .... Kelsey-Hayes stock has shot up recently, partly on the strength of Ford business. It has re-equipped its foundry, long dormant, and will at least make some Ford brake drums if not more complete cast wheel assemblies .... Try and find the word six in Chevrolet newspaper and magazine advertising in connection with its motor .... Graham will extend the beading on its small job completely around the body; Graham resumed last week, following the holiday shutdown, at close to 450 units.

Bucyrus-Erie Open in South Milwaukee Fete

In co-operation with the committee in charge of the centennial celebration of South Milwaukee, Wis., the Bucyrus-Erie Co., largest industry in the city, has arranged an open house throughout its plant on July 20. A reception will be held from 9 to 12 for all employes, members of their families and friends. From 1 to 4 p.m., all citizens of South Milwaukee, with other specially invited guests in industry in the Milwaukee metropolitan area, will be received. All of the company's products will be on exhibition. N. Rulison Knox, vice president, is general chairman of the open house.

All-Metal Staterooms Thrust At Fire Hazard

(*Concluded from Page 20*)

ing fitted with a seal all around to prevent passage of flame and sound. The doors themselves are of double sheet construction with the same sound and fire-resisting properties as the bulkhead panels.

The building of this stateroom unit, which represents a new attack on an old problem, has demonstrated that an all metal stateroom can be built within the weight allowance, available with modern ship design for a reasonable cost and with pleasing appearance.

The obvious advantages are that all risk of fire so far as the stateroom structure is concerned has been eliminated, there being nothing combustible in the room except the washable linen and the passenger's own effects, and it has already been demonstrated that the temperature produced by the burning of such material will be low, probably not more than 400 degrees Fahr. Furthef, fire cannot be transmitted to adjacent rooms and will be easily extinguished or burn itself out at its point of origin.

Equipment

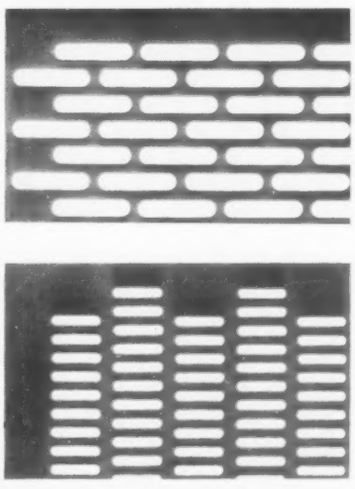
New York—By placing orders for more machine tools at $1,500,000, the Amtorg Trading Corp. has bought machinery involving an expenditure of $4,500,000 with machine tool builders and engineering firms in the United States, equipment being mostly for Russian automobile plants. In addition to placing more business with the companies announced in STEEL last week as sharing in the volume, contracts have also been made with the following for new equipment included in the $1,500,000 purchase: Pratt & Whitney Co., Cone Automatic Machine Co., Blanchard Machine Co., Lees-Bradner Co., Reed-Prentice Co., Black & Decker Mfg. Co., Greenlee Bros. Co., Abrasive Machine Tool Co., Giddings & Lewis Machine Tool Co. and Snyder Tool & Engineering Co. Several dealers and shops have booked heavy orders, elsewhere.

Several hundred tools have been bought for New York technical schools and more are being readvertised. One dealer booked 17 lathes for the Samuel Gompers school last week, also three for the Delaware, Lackawanna & Western railroad. For its repair shop the Madison Avenue Coach Corp. is asking bids on ten tools, including several lathes, while 40 machines, some of them small woodworking units, are up for the maintenance shop, Mattewan, N. Y., state hospital.

Alco Products Co., Dunkirk, N. Y., subsidiary of American Locomotive Co., has booked orders for refinery equipment from Shell Petroleum and Crown Petroleum companies totaling $325,000.

Chicago—Machinery and equipment markets have shown renewed life recently. A number of sellers and manufacturers report a definite turn for the better in business since late June and anticipate favorable activity during the near future. Machine tool sales in particular have shown an increase compared with a month ago, while small tool demand also has been more active lately. Various types of miscellaneous plant equipment were in better call the past week. Electro-Motive Corp. distributed additional orders for machine tools on its current list, but a fairly large number remain pending. About a dozen machine tools for a Chicago sanitary district shop have yet to be placed. Repair part orders constitute practically the only business in machinery from railroad shops.

Boston — Machinery contracts, mostly for Russian automobile factories, have been placed with additional New England shops while more purchases have been made from district machinery builders listed last week as having obtained such orders. As a result, operating schedules are being stepped up, heavier material purchases made and a number of shops have acquired substantial backlogs. It is understood this Russian buying has been done on credit terms more favorable to sellers than has been the case in the past. Domestic inquiry and buying



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has been well sustained. Individual orders as a rule are for one or two tools at a time. Shops in this district have also booked considerable government volume within the last month.

Construction and Enterprise

Illinois

CHICAGO—A. O. Aldrich Co. Inc., 507 Lake street, has been incorporated to manufacture machinery and electrical appliances, by A. O. Aldrich, Rowena A. Aldrich and Rita Scheck. Correspondent: Smith & Hadded, 176 West Adams street.

FISHER, ILL.—City has been allotted federal grant of $22,500 to complete waterworks, including well, pump and building, elevated tank, fire equipment and distribution system.

MENDON, ILL.—City plans waterworks and distribution system costing $44,000.

ROCK ISLAND, ILL.—United States engineer office, Clock Tower building, will open bids Aug. 14 for construction of dam No. 18, in the Mississippi river. Project includes installation of roller gates and tainter gates, including embedded metal and electric heaters; operating machinery, comprising electric motors, brakes, limit switches, controllers and spare parts.

WOOD RIVER, ILL.—Shell Petroleum Corp., 50 West Fiftieth street, New York, plans refinery additions and reconditioning, including erection of cracking plant, at its plant here. Cost to exceed $500,000.

MUNDELEIN, ILL.—Cozy-Comfort Shoe Co. has started construction of a 1-story shoe manufacturing plant, 40 x 200 feet, at Lake avenue and Division street.

Ohio

PIQUA, O.—City plans extensions in transmission and distributing lines for service in three rural districts in this vicinity, and expanding facilites of city-owned electric light and power plant. Cost estimated at $29,000. F. R. Beuchner, city manager, is in charge.

TOLEDO, O.—Erie Tool & Supply Co. has been incorporated by John J. Kendrick, John M. Zuber and Alan B. Loop. Correspondent: Fraser, Effler, Shumaker & Winn, Home Bank building.

TOLEDO, O.—National Supply Co., oil well equipment manufacturer, plans a $500,000 construction program in Niels Esperson industrial district, Houston, Tex.; has acquired a five-acre site and will erect an asesmbling plant.

Michigan

BESSEMER, MICH.—Town has awarded contract to Barnett & Record, Minneapolis, for construction of sewage disposal plant, costing approximately $65,000.

DETROIT—Grant of $656,181 to city for construction of four incinerator plants by the city has been approved by the government.

DETROIT — Robinson Ventilating Corp., Transportation building, has been incorporated to do general manufacturing, by J. R. Robinson, Zelienople, Pa.

HIGHLAND PARK, MICH.—City has been granted $119,045 federal funds for construction of new sewage disposal plant.

HILLSDALE, MICH.—Hillsdale Mfg. Co., is considering construction of a large addition to its plant.

KINGSFORD, MICH.—City is completing surveys and estimates of cost for proposed municipal electric light and power plant. Federal Engineering Co., Davenport, Iowa, consulting engineer.

MUSKEGON, MICH.—PWA loan of $500,000 loan has been granted to city for completion of its sewage system.

PORT INLAND, MICH.—Inland Lime & Stone Co. is constructing additional dock facilities.

TAWAS CITY, MICH.—Town will receive federal grant of $26,950 for construction of a complete waterworks system.

Indiana

INDIANAPOLIS — National Motors Corp., 1145 East Twenty-second street, has been formed to manufacture airplane engines, by John F. Kurfiss, E. K. Rahke, M. E. Elstun, Roy C. Fulcher, J. W. Folger, A. V. Pickett, William Storen and Kenneth W. Folger.

KOKOMO, IND. — Crosley Radio Corp., Cincinnati, plans installation of motors, and controls, conveyors and other equipment in new radio and electric refrigerator works here. Cost close to $150,000 with machinery. (Noted June 17).

MUNCIE, IND.—Muncie Parts Mfg. Co. Inc., 906 West Ninth street, has been formed to manufacture metal products, automotive parts and accessories, by Burle Plank, Louis Conne and William Plank.

SOUTH BEND, IND.—Sibley Machine Co. is planning to install motors and controls, conveyors, electric hoists, etc., in new plant addition. Estimated cost $100,000, including machinery. F. D. Chase Inc., 307 North Michigan avenue, Chicago, architect and engineer.

Maine

BANGOR, ME.—Tide Water Oil Co. has approved plans for immediate erection of a new 3,000,000-gallon storage terminal here. The project includes a district office, large warehouse, dock for tanker deliveries and facilities for railroad and truck trans-shipments.

New York

CORNWALL-ON-HUDSON, N. Y.—Village has made plans and will soon take bids on sewage disposal plant costing about $175,000. Morrell Vrooman Inc., 21 North Main street, Gloversville, N. Y., engineer.

GREENBURGH, N. Y.—Town council will soon take bids for construction of a sewage system. Estimated cost $226,000.

SOUTH CORNING, N. Y.—Village is planning erection of water supply system, costing $53,000, and will apply to PWA for funds. R. Hoyt, 238 Delaware avenue, Corning, N. Y., is engineer.

Pennsylvania

NEW KENSINGTON, PA.—Aluminum Cooking Utensil Co. has started construction of a six-story addition costing approximately $250,000. Four floors will be used for expansion of manufacturing facilities and two for warehousing.

Kentucky

LOUISVILLE, KY.—Wheeling Corru-

(Please turn to Page 94)

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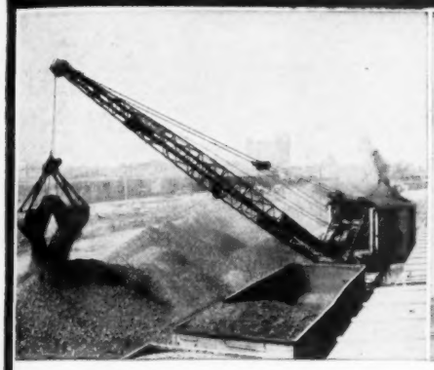

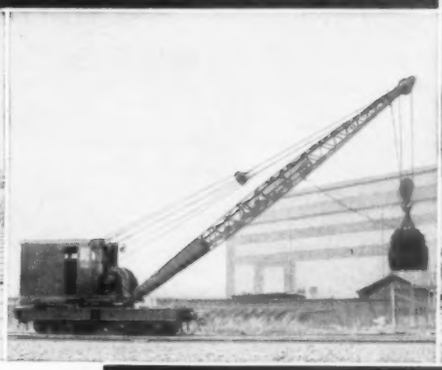

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(Concluded from Page 92)

gating Co., Wheeling, W. Va., has announced plans for opening a branch manufacturing and distributing plant here. A five-year lease on a factory building, containing 45,000 square feet, has been closed. Roofing and sheet metal products will be fabricated at the plant.

Alabama

AUBURN, ALA.—S. E. Wittel Handle Mfg. Co., has started erection of a manufacturing plant, costing about $30,000.

Maryland

HAMPSTEAD, MD.—City will issue $35,000 bonds for constructing water supply system.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids July 26, schedule 5537, on engine generators, delivered Submarine Base, Conn.

Mississippi

GREENWOOD, MISS. — City has voted $192,000 bonds for extension of light and water plant.

Florida

BELL GLADE, FLA.—City has grant of $36,000 for construction of complete waterworks system.

DAYTONA BEACH, FLA.—City has PWA grant of $122,318 for improvements to waterworks system, two elevated storage tanks, consolidated treatment works, etc. Robert & Co., Atlanta, Ga., engineer.

North Carolina

MANTEO, N. C.—City plans water plant; will apply for $30,000 PWA grant.

STONEY POINT, N. C.—Killingsly Worsted Mills, Danielson, Conn., plans altering Adell Yarn Mill here into a worsted yarn manufacturing plant. Estimated cost $75,000, including equipment.

West Virginia

HOGSETT, W. VA.—United States engineers office, Huntington, W. Va., receives bids Aug. 5 for constructing operation building, installing all operating machinery, including gasoline electric power unit, tanks, pumps, pumping equipment for hydraulic operating machinery, piping, air compressor, switchboard and traveling crane, and installing complete lock electrical system.

Virginia

NORTH GARDEN, VA.—Virginia Fruit Brandy Distilling Corp., recently incorporated with $100,000 capital, by E. C. Knight, Rural Retreat, Va., and R. T. Lipscomb, Richmond, Va., is planning to erect a distillery here.

STAUNTON, VA.—Charles R. Ralston, Staunton chamber of commerce, reports that plans are practically completed for establishment of a $400,000 distillery by the American Distilling Co.

Missouri

ST. LOUIS—Claude E. Vrooman, St. Louis financier, has advertised the properties of the Ozark Southern Railway Co. for foreclosure sale on June 17. The entire holdings of the 15-mile line, consisting of rolling stock, rails, real estate, rails and buildings will be disposed of.

ST. LOUIS—McDonald Construction Co. has been awarded contract by Chicago, Burlington & Quincy railroad, 107 Franklin street, St. Louis, for construction of a coal handling plant at Front and Winter streets, East St. Louis, Ill., The building will cost $69,000.

ST. LOUIS—Allen L. Snyder, engineer in charge of construction for Union Electric Light & Power Co.'s hydroelectric plant near Bagnell, Mo., has submitted proposal to city, Mayor Dickman, and board of aldermen, for constructing municipal hydroelectric plant on Gasconde river. Total cost of project is estimated at $11,000,000.

Arkansas

CHARLESTON, ARK.—City has PWA grant of $26,000 for waterworks system, comprising filtration plant, elevated storage tank and complete distribution system.

Oklahoma

BARNSDALL, OKLA.—City is making surveys for reservoir and filter plant, costing $60,000. V. V. Long & Co., engineer, Colcord building, Oklahoma City, Okla.

EL RENO, OKLA.—Canadian Mill & Elevator Co., Herman K. Schafer president, will rebuild its 625,000-bushel plant recently damaged by fire.

Texas

BROWNSVILLE, TEX.—Valley Port Refining Co., G. L. Rowsey president, has let contract to Wyatt Metal & Boiler Works, Dallas, Tex., for constructing a 5000-barrel refinery. Estimated cost $200,000.

CENTER, TEX.—City has applied for PWA loan and grant of $76,000 for waterworks system.

DALLAS, TEX.—D. & B. Pump & Supply Co., L. C. Scott sales manager, plans $100,000 expansion program at Love field, and erection of a 70 x 90-foot addition to present factory at 7628 Maple avenue, as well as rebuilding present plant and installing new equipment. Modern machinery for manufacture of sucker rods, pumps and fittings will be installed. The company also plans to build service shops in major midcontinent fields.

LOVELADY, TEX.—City, R. A. Shaw mayor, receives bids July 27 for waterworks system, including distribution system, and installing pump.

SHERMAN, TEX.—City has applied for PWA loan and grant of $100,000 for waterworks system.

Wisconsin

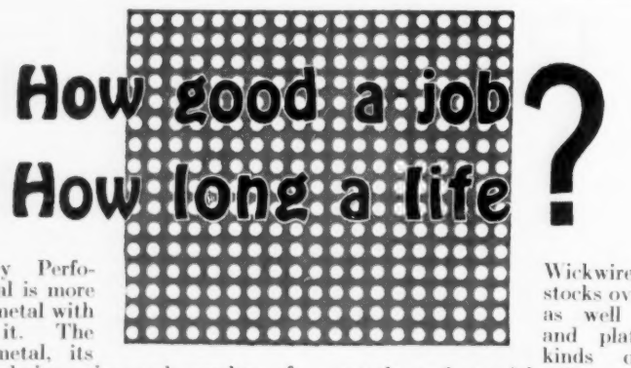
APPLETON, WIS.—Board of vocational education has engaged Architect W. Fred Dolke, Evanston, Ill., to make plans for an addition, 71 x 121 feet, to the vocational school for machine, electrical and woodworking shops, and for remodeling the present school to accommodate drafting and print shops. Herbert Heilig is director.

EAU CLAIRE, WIS.—City council has selected Greeley & Hansen, engineers, 6 North Michigan avenue, Chicago, to make investigations and reports on proposed municipal sewage disposal plant and sewer interceptor system to cost about $500,000.

GRANDON, WIS.—W. B. Gambill Distilling Co. has been incorporated to build and operate a distillery, by W. B. Gambill, F. H. Himes and G. W. Ison. The new company will soon start construction of a distilling plant and warehouse.

GREEN BAY, WIS.—Cohodas Bros., 530 North Broadway, are about to take bids for construction of a $50,000 cold storage warehouse and office building on Mather street.

MADISON, WIS.—City council will receive bids until July 17 for pumping equipment for municipal waterworks system, including deep well turbine pump, horizontal centrifugal booster pump, chlorinator, at Nine Springs well; horizontal centrifugal pump,



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chlorinator, motors, etc., at new East well; steam turbine, horizontal centrifugal pump, reduction gear, condenser, etc., at main pump station.

MARSHFIELD, WIS.—R. Connor Co. will soon start work on rebuilding planing mill and flooring warehouse recently destroyed by fire.

MILWAUKEE—Rundle Mfg. Co., enamelers, 3305 West Forest Home avenue, has awarded contract for construction of a new 1-story factory.

NEENAH, WIS.—J. W. Hewitt Machine Co., North Commercial street, has awarded contracts for construction of a 2-story addition to factory and remodeling of present building.

WHITEWATER, WIS.—Whitewater Brewing Co. plans remodeling brewery and to install new equipment in boiler house and engine room.

Minnesota

MINNEAPOLIS—Minneapolis Pattern Works has been incorporated with a capital stock of $25,000 to manufacture patterns and models, by J. A. Peterson, M. O. Ingebrigtsen and Carl J. Gustafson.

MINNEAPOLIS—Stewart Paint Co., 1729 Second street, North, is having plans made for a 1-story paint manufacturing plant, to cost about $40,000. E. J. Prondzinski, 616 Civic & Commerce building, is architect.

PARK RAPIDS, MINN.—Village, W. Langguth clerk, plans sanitary sewer system. Estimated cost $75,000; will seek PWA funds. E. A. Briggs, 1955, University avenue, engineer.

RED WING, MINN.—Maj. Dwight F. Johns, district government engineer, 615 Commerce building, St. Paul, will receive bids until July 23 for construction of lock No. 3 in the Mississippi river, requiring approximately 96,000 square feet of steel sheet piling, 370 tons of wall armoring structural steel, 328 tons of miter-gate structural steel, 184 tons of miscellaneous structural steel, 753 tons of reinforcing steel, 114 tons of steel forgings, 28 tons of steel castings and 22 tons of nonskid steel floor plating.

ST. PAUL—Brown Sheet Iron & Steel Co., Berry avenue and Pearl street, manufacturer of steel tanks, boilers, brewery equipment, etc., has awarded contract for construction of a 1-story factory addition, 50 x 75 feet.

Iowa

SIOUX CITY, IOWA — Cudahy Packing Co., 221 North LaSalle street, Chicago, has awarded contract to Klinger Construction Co., Warnock building, Sioux City, for construction of a steel and concrete loading dock, costing about $50,000, and which will be equipped with complete machinery and equipment for loading.

Pacific Coast

HUENEME, CALIF.—Contract has been awarded to A. Schroeder, Oxnard, Calif., for construction of a lemon packing plant here for the Oxnard Citrus association. The cost, including equipment, will be about $200,000. J. D. McGrath is president of the association.

LOS ANGELES——Thermador Electrical Mfg. Co. is building a new plant at 2819 East Pico boulevard, at a total investment of $35,000.

LOS ANGELES—Kern Syrup & Preserving Co., 910 Mateo street, is constructing a new plant at 2849 East Pico boulevard. Expenditure of $100,000 is involved in building and installing modern equipment.

NORWALK, CALIF.—Contract for construction of a $900,000 refinery near here for the Wilshire Oil Co., 2455 East Twenty-seventh street, Los Angeles, has been awarded to the Ralph M. Parson Co., Mt. Vernon, O.

Works Program Applications

The following are applications filed with the division of applications and information of the President's work relief program, in Washington, for allotment of funds. An application does not necessarily indicate the program will mature:

Jeffersonville, Ind.—Rehabilitation of warehouses, shops, offices and other structures, $193,761.

Baltimore—For sewerage system and new septic tank, $75,000.

Louisville, Ky.—Erection of quartermaster maintenance building and shops at Fort Knox, $45,000.

Newport, Ky.—Reconstruction of quartermaster utility shops at Fort Thomas, $65,000; construction of garage and shop, $25,000.

Portland, Me.—Rehabilitation of buildings, plants and utilities at Fort McKinley, $83,126.

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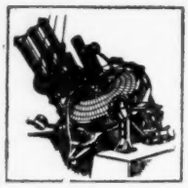

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